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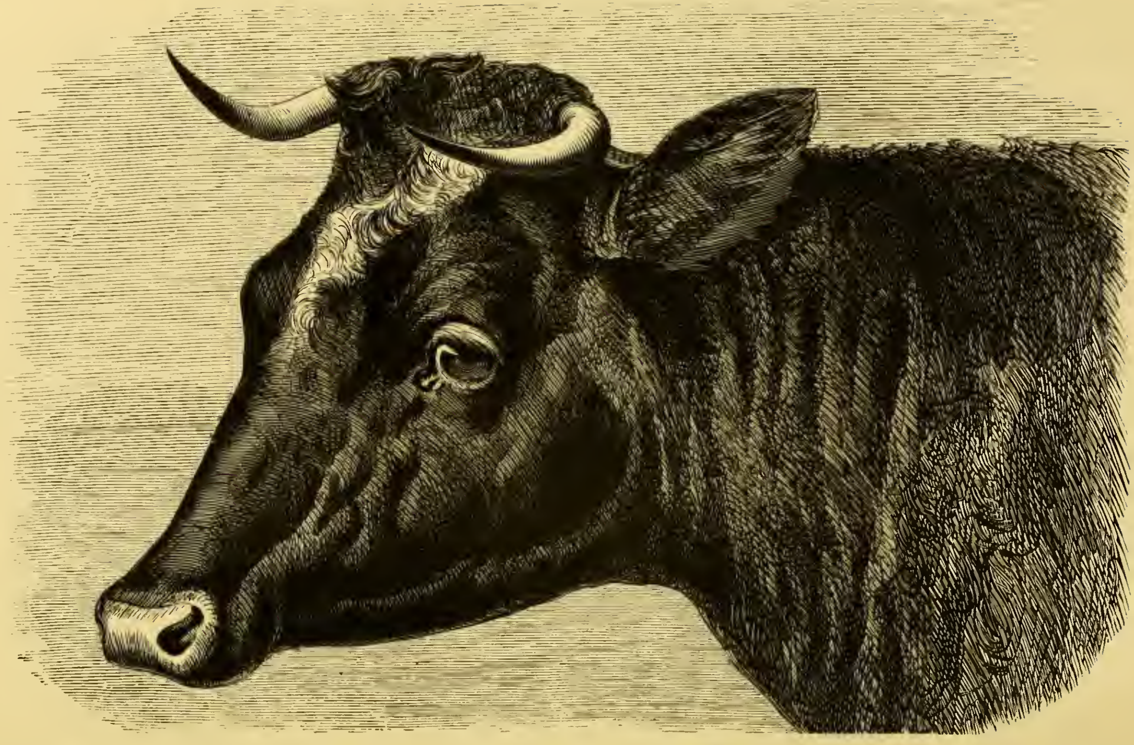


Head of "AURORA, 2D,"—Shorthorn,—owned by H. G. WHITE, South Framingham. See Preface to Abstract of Returns.

FIFTEENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

Massachusetts Board of Agriculture,

TOGETHER WITH

REPORTS OF COMMITTEES

APPOINTED TO VISIT THE COUNTY SOCIETIES:

WITH AN APPENDIX

CONTAINING AN ABSTRACT OF THE

FINANCES OF THE COUNTY SOCIETIES

FOR

1867.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
No. 4 Spring Lane.
1868.

STATE BOARD OF AGRICULTURE.

1868.

MEMBERS EX OFFICIIS.

His Excellency ALEXANDER H. BULLOCK.
His Honor WILLIAM CLAFLIN.
Hon. OLIVER WARNER, *Secretary of the Commonwealth.*
WILLIAM S. CLARK, *Pres. Mass. Agricultural College.*

APPOINTED BY THE GOVERNOR AND COUNCIL.

	Term Expires.
EPHRAIM W. BULL, *of Concord*,	1869
LOUIS AGASSIZ, *of Cambridge*,	1870
MARSHALL P. WILDER, *of Dorchester*,	1871

CHOSEN BY THE COUNTY SOCIETIES.

Massachusetts,	LEVERETT SALTONSTALL, of Newton,	1871
Essex,	GEORGE B. LORING, of Salem,	1869
Middlesex,	JOHN B. MOORE, of Concord,	1870
Middlesex North,	ASA CLEMENT, of Dracut,	1871
Middlesex South,	JOHN JOHNSON, Jr., of Framingham,	1869
Worcester,	THOMAS W. WARD, of Shrewsbury,	1869
Worcester West,	COURTLAND SANDERSON, of Phillipston,	1869
Worcester North,	THOMAS BILLINGS, of Lunenburg,	1869
Worcester North-West,	CHARLES C. BASSETT, of Athol,	1871
Worcester South,	NEWTON S. HUBBARD, of Brimfield,	1871
Worcester South-East,	WILLIAM KNOWLTON, of Upton,	1870
Hampshire, Franklin and Hampden,	H. S. PORTER, of Hatfield,	1870
Hampshire,	JOHN A. MORTON, of Hadley,	1871
Highland,	MONROE F. WATKINS, of Hinsdale,	1869
Hampden,	WILLIAM BIRNIE, of Springfield,	1870
Hampden East,	H. S. WARD, of Monson,	1870
Union,	E. W. BOISE, of Blandford,	1871
Franklin,	IMLA K. BROWN, of Bernardston,	1871
Berkshire,	ALEXANDER HYDE, of Lee,	1870
Hoosac Valley,	JOHN L. COLE, of Williamstown,	1870
Housatonic,	T. D. THATCHER, of Lee,	1870
Norfolk,	ELIPHALET STONE, of Dedham,	1871
Hingham,	ALBERT FEARING, of Hingham,	1870
Bristol,	AVERY P. SLADE, of Somerset,	1869
Bristol Central,	NATHAN DURFEE, of Fall River,	1870
Plymouth,	CHARLES G. DAVIS, of Plymouth,	1869
Marshfield,	GEORGE M. BAKER, of Marshfield,	1870
Barnstable,	GEORGE A. KING, of Barnstable,	1871
Nantucket,	JAMES THOMPSON, of Nantucket,	1869
Martha's Vineyard,	JOHN PIERCE, of Edgartown,	1871

CHARLES L. FLINT, *Secretary.*

FIFTEENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

BOARD OF AGRICULTURE.

To the Senate and House of Representatives of the Commonwealth of Massachusetts.

The meteorological features of the past year have been somewhat remarkable. They serve to show how powerful an influence the character of the weather, especially that of the growing months, has upon the practical work and the prosperity of the farm. The variations in the seasons, the droughts of one summer, and the rains of another, constitute one of the obstacles against which the farmer has to contend and introduce elements of uncertainty in his calculations which do not exist in a more fixed and uniform climate.

In a season of unparalleled vegetable growth, the hay crop, so essential to a northern latitude, is, of course, abundant. This, under ordinary circumstances, would reduce the price of that important staple ; but the barns throughout the State had become so completely emptied the last spring that the price of this, as well as other feeding substances, has been strongly maintained.

The cost of farm labor ranged high throughout the early part of the year, while the frequent interruptions to work made it more than ordinarily difficult to carry on permanent improvements without expenditures which the results would not justify.

It is now confidently believed that the disease commonly known as pleuro-pneumonia has been completely eradicated; and it is a subject for congratulation that the efficient efforts on the part of the Commonwealth have been attended with success, so far as we can judge at the present time. The recent experience in Great Britain in the treatment of this disease, as well as of the cattle plague—both dangerous contagious diseases—has been sufficient to satisfy every candid, thinking mind in our own State that our efforts and expenditures to purchase immunity were well-timed and judicious. The Commissioners now tender their resignation, and the following is understood to be their

FINAL REPORT.

To the Senate and House of Representatives of the Commonwealth of Massachusetts:

The Board of Commissioners on Contagious Diseases among Cattle, which has been continued in accordance with the wish of His Excellency the Governor during the year past, the object being to guard against the introduction of the cattle plague, (rinderpest,) which has caused so much loss in Great Britain during the past three years, or the possible breaking out and spread of the disease called "pleuro-pneumonia," which has heretofore prevailed to an alarming extent in this Commonwealth, congratulate the people upon the exemption from the former, and the probable extinction of the latter, from our herds.

From the latest reports it appears, through the energetic action of the English government the rinderpest is nearly "stamped out;" consequently the fear that it would be brought to this country is lessened. Should, however, the calamity occur, it is to be hoped that the same rigorous measures adopted by Massachusetts to extirpate pleuro-pneumonia, and Great Britain the rinderpest, would be executed without delay. These measures, together with the restriction placed upon the importation of cattle by our government, have so far protected us against the rinderpest. The active and timely exertions made in our Commonwealth have saved our herds from the devastation which was so seriously threatened by the pleuro-pneumonia, so that by the expenditure of a very small proportion of the appropriations made in 1864 and 1866, we have now entire confidence that it is eradicated; and from what we now know of the nature of the disease, we feel certain that it will not again appear among our herds, unless, as in 1859, imported from beyond our limits.

As the commission has accomplished the work for which it was appointed, in tendering to His Excellency our resignation, we congratulate the people upon the success which has been insured by the prompt action of the State Board of Agriculture, and especially its Secretary, in connection with the legislature, and with the co-operation of many of the leading agriculturists and breeders of stock among our citizens, in eradicating one of the worst forms of contagious disease which has been found among the cattle. And we would at the same time congratulate the breeders of stock that the investigations of scientific men in relation to this, as well as other forms of disease peculiar to animals, is tending in so large a degree to save them and the country from such great losses as they would otherwise inevitably incur.

The Commissioners have been called in several instances during the past year to examine diseased cattle.

In one herd only, and but for a few days, during which three cows died, was there any evidence of a contagious disease found. The character of the disease is unknown, as the animals had been buried before our arrival at the farm.

E. F. Thayer,
Chas. P. Preston,
Commissioners.

December 30, 1867.

PUBLIC MEETING OF THE BOARD

AT CONCORD.

The Annual Meeting of the State Board of Agriculture for lectures and discussions, was held in the town hall at Concord, commencing on Tuesday, December 10, and continuing three days. The meeting was called to order on Tuesday, at noon, by Hon. E. W. Bull, of Concord, who said:—

Gentlemen,—I find it devolves upon me, as Chairman of the Committee on Meetings, to open the proceedings with what is announced as an "address." I do not propose to give you a set address, but a few general remarks upon the great interest of agriculture; for the address to which we had the honor of listening last year, from Dr. Loring, of Salem, was so exhaustive upon all topics of special interest to the Board, and with regard to the history of the Board, as to leave nothing to be said in those directions. Any *resumé* of the agricultural doings of the country during the last year falls more properly to our Secretary, and will be done so much more efficiently by him, that I do not propose to say anything upon that subject.

I propose to ask your attention, for a few moments, to the history of the Board, and to the agriculture of the State during the sixteen years or more the Board has been in operation. During these years the Board has been organized, and the agriculture of Massachusetts has made a steady advance; and this advancement has been due, in part, at least, to the constant efforts of the Board to promote and improve the art of farming. It is emphatically a representative body, composed almost wholly of delegates from the agricultural societies of the State, bringing the various practices of husbandry in all parts of the State to the criticism and discussion of its members in convention twice every year, receiving from its various committees every year exhaustive reports upon all the important branches of agriculture, which are published in the Transactions for gratuitous distribution among farmers, and for exchange with other States for their published experiences, so that the experience of many of the States is brought within the reach of all who will take the trouble to go to the office of the Secretary at the State House. All these commend it to the farmer as his department in the State organization—really the Department of Agriculture. The Board has also aided, by the distribution of its Transactions, and the personal efforts of its members, in the organization of Farmers' Clubs, those effective institutions, which, wherever they have existed, have greatly improved the farming in their vicinity, and have done much towards demonstrating that farming is an intellectual pursuit, and thrives in proportion as intellect is applied to it. In this town the crops have increased twenty-five per cent. since the formation of our Farmers' Club. On our light land over twenty bushels of prime wheat to the acre have been raised by several persons during the last three or four years. But this yield of wheat is light in comparison with what has been obtained by many practical farmers in the State. Thirty years ago, two gentlemen in Dorchester, where I then resided, raised thirty-five bushels to the acre without special cultivation, and in the ordinary rotation of crops then beginning to prevail. In both these instances the wheat followed potatoes, highly cultivated. Thirty miles from here, on the line of this railroad, Daniel Williams, a blacksmith, raised sixty-three bushels and three pecks of Black Sea wheat from an acre of ground, which went upon record, and was published in the "New England Farmer" of that day. In that case, also, the wheat followed potatoes, the potatoes yielding 300 bushels to the acre—then a good crop, but not an extraordinary one. And up among the hills of Berkshire it is the commonest thing to have crops of corn reaching 100 bushels to the acre; they do not think anything of it, it is so common. Showing that in Massachusetts the soil and climate, with intelligent cultivation, are capable of producing as much as any other part of the country, and that our agriculture is the main interest, and may be made a very profitable interest.

In the great North-West, the sole purpose of the pioneer and the new settler, (as they may all be called, for that is a new country,) is to get as large a crop as possible without much expense. He continues to crop that fertile land, therefore, in the cheapest possible way, exhausting the soil. We have gone through with that process. We have exhausted the land of Massachusetts, and we can only restore it to proper fertility by intelligent cultivation, by rotation of crops, by skilful application of manure and all the arts of husbandry, now so much better understood than ever before.

I said agriculture was an intellectual pursuit; and if any proof of that were wanted to-day, we find it in Europe—in the older countries—where the exigencies of the case have compelled them to apply science, skill, intellect, to their farming that they may succeed. A writer in the "Revue des Deux Mondes," in Paris, contrasting Germany with France, states that up to 1833 farming in Europe was as it had been from the time of Charlemagne—a rotation of two years in cereals and one in fallow; that since then there seems to have been, in Germany, a change of system—two years of cereals alternating with one year of potatoes, turnips, carrots and beets, and one year fallow ; and there has been a great increase of stock and manure, and a diminution of naked fallow from one-third to one-seventh ; that France has gone on in the old way, the area of fallow land being about the same as it was a century ago. The writer has taken the live stock of Germany—the sheep, horses, asses and swine—and reduced them to the value of horned cattle, and he finds by the agricultural census of 1865, in Germany, 100 units of such value for 138 inhabitants, while France had only 100 units to 185 inhabitants. Going back forty years, he finds that the position of the two countries was exactly the reverse of what it is at the present time. Germany, as well as France, manufactures nearly all her own sugar from beets. In 1837 the product of Germany was three millions of pounds, while in 1865 it had reached the enormous amount of three hundred and seventy-five millions of pounds. Under the improved system of agriculture, land has advanced, upon the average, 150 per cent. Most striking is the difference in population. From 1846 to 1860—fourteen years—North Germany added, in round numbers, one million to its agricultural population ; while France, during the same period, lost seven hundred thousand of its farming population. The writer inquires into the causes of this marked divergence between the two countries in agriculture—the constant growth of Germany and the constant decrease of France—and comes to the conclusion that it arises from the fact that Germany has adopted a systematic course of instruction, embracing the physical sciences and political economy as well as mere farming. This, with the economical habits of the Germans, is the cause of the unexampled prosperity of that country. Germany, as you know, has instituted schools for instruction in farming—agricultural schools—in which not only general agriculture, but all the specialties of agriculture, the cultivation of the vineyard, and all other branches, are taught by professors devoted to that particular duty ; and the result has been an extraordinary increase in the production and in the wealth of that country ; and such, I cannot doubt, will be the result here.

But perhaps the most brilliant discoveries of the day are those of Prof. Ville, Professor of Vegetable Physiology at the Museum of Natural History at Paris, who for more than ten years has devoted his time to the discovery, if it were possible, of those scientific laws which govern agriculture, so that a man may be sure of his results—as sure, setting aside contingencies of season, which affect all crops under any circumstances, as in any other pursuit. Giving up the ordinary methods of analysis, which have been found to be uncertain, and sometimes to have led to fallacious results, even on the part of most eminent men—as Prof. Liebig, for instance, who has had to modify his published opinions many times, as men who grow will often have to do—he took another method. Commencing with barren sand and a flower-pot, he added to that barren sand certain properties necessary in agriculture—for instance, phosphate of lime, potash, nitrogenous substances, and lime—lime only in the form of humus. He found that when one constituent was added, certain plants would grow in it, while others refused. Two of these constituents being added, a still larger number of plants would grow; and when, in short, all these constituents were added, in their proper proportions, a full crop—an abundant crop—was obtained. He found these proportions by these various experiments, covering, as I say, ten years of active labor, and finally went upon a farm at Vincennes, which the French emperor set apart for his purposes. By the way, I may say here that he met with the most determined opposition from the savans of that day, who questioned all his positions, who insisted upon the old science, and denied that it was possible to find out any general law through this method—through the making of the plant; for that is what it was; that was the laboratory out of which the truth came finally. You know how easy it is to dispute upon these matters; you know how difficult it is to make scientific men agree upon any proposition; and, in fact, it is only through continual controversies that the truth is reached at last.

I was saying that the French emperor, satisfied that Prof. Ville was upon the right track, put a farm into his hands, at Vincennes, where he demonstrated all his propositions to be true, and in the season of harvest invited all the country side to come and see the results, which proved completely the truth of his propositions.

Now, if that be true, we have found the key to a new husbandry, which will give us assured success; for whereas, under the past and present systems of husbandry you have to substitute for the old fallow manures, and are obliged, therefore, to keep a heavy stock to make manures to enrich your farm and get good crops, these artificial manures—your phosphates, your potashes, and the various combinations of nitrogenous substances—may be taken into the interior, to any distance, and the farmer who cannot keep cattle, or has to commence without them, can immediately proceed to fertilize his farm and get full crops. If that be true, as it seems to be true, then concentrated salts, with the addition of humus, and the small percentage of lime necessary to make that humus accessible to the plant, will enable you, as in the presence of manures, with the addition of the other salts, to go on to success.

Of carbonaceous matters, it does not appear that it is necessary to have a great supply, any further than to amend the soil, so as to enable it to resist droughts and heavy rain. The soil, in other words, must have a proper mechanical preparation ; it must be in the nature of a sponge, which will hold the solution you put to it, otherwise it might run to waste before the plant could apply it to its own uses, and grow into stalks and grain.

Prof. Ville has published a little *brochure*, entitled "Six Lectures on Agriculture." Some of you must have seen it ; some, perhaps, have not. Let me read a few excerpts from the translator's preface :—

> "When agriculturists demand an analysis to test the richness of a field, and repair its losses after each harvest, they lose sight of the fact that each field has its own peculiar wants, and what will suit one may not suit another.
>
> "It is by stating the problem in these terms that M. Ville has arrived at its solution. He has studied the appetites of each plant, or at least of those three great families of plants upon which agricultural industry is mostly exercised, viz.: the cereals, leguminous plants, and roots ; and he has deduced from this study the formula of a normal manure. * *
>
> "To operate with greater certainty, M. Ville removed every element of error or doubt from his experiments, and proceeded by the synthetic method. He took calcined sand for his soil, and common flower-pots for his field. Ten years of assiduous observation and experiment led him to recognize that the aliment preferred by cereals is—*nitrogen ;* by leguminous plants—*potassa ;* by roots—the *phosphates ;* we say the *preferred*, but not the *exclusive ;* for these three substances, in various proportions, are necessary to each and all, and even *lime*, which humus renders assimilable, must be added.

"These facts, proved in pure sand by means of fertilizers chemically prepared, were next repeated in the soil of a field on the imperial farm at Vincennes, at the expense of the emperor. * * *

"During the past four years, curious visitors, drawn to the farm by the report of M. Ville's experiments, have been shown a series of square plots, manured and sown in conformity with rules laid down to test their efficacy. Upon some of these plots the seed has never been varied; the same soil has been planted four times in succession with wheat, colza, pease and beet-root; giving them, at the commencement, a supply of the normal manure, and adding annually what M. Ville terms the *dominant* ingredient—that is to say, the special manure of the series. Upon the other plots the seed alternated during the quarternary period at the expense of the normal manure, by changing the dominant according to the nature of each plant introduced into the rotation; and under these conditions the crops have reached to results of irrefutable eloquence.

"By adding, according to M. Ville's system, nitrogenous matter, phosphate of lime and potassa—that is to say, a normal or complete manure to calcined seed, the seed—wheat being equal to 1—the crop is represented by 23.

"Upon withdrawing the nitrogenous matter from this mixture of the four elements, the crop fell to 8.83.

"Upon withdrawing the potassa, and retaining all the others, the crop only attained to the figure 6.57.

"When the phosphate of lime was omitted, the crop was reduced to 0.77; vegetation ceased, and the plant died.

"Lastly, upon abstracting the lime, then the crop, the maximum of which was represented by 23, was only 21.62.

"From the above facts we draw these conclusions: that if the four elements of a perfect manure, above named, act only in the capacity of regulators of cultivation, the maximum effect they can produce implies the presence of all four. In other words, the function of each element depends upon the presence of the other three. When a single one is suppressed, the mixture at once loses three-fourths of its value.

"It is to be remarked, that the suppression of the nitrogenous matter, which causes the yield of wheat to fall from 23 to 8.33, exercises only a very moderate influence upon the crop, when the plant under cultivation is leguminous. But it will be quite otherwise if, in such cases, we remove the potassa.

"If we extend the experiment to other crops, and successively suppress from the mixture one of the four agents of production, we arrive at the knowledge of the element which is most essential to each particular crop, and also which is most active in comparison with the other two. For wheat, and the cereals generally, the element of fertility *par excel-*

lence, — that which exercises most influence in the mixture, is the nitrogenous matter. For leguminous plants, the agent whose suppression causes most damage is potassa, which plays the principal part in the mixture. For turnips and other roots the dominant element is phosphate of lime.

"By employing these four well-known agents, M. Ville's system may well replace the old system of cultivation. With him, the rule that manure must be produced upon its own domain is not absolute. During four succeeding years, M. Ville has cultivated, at the Vincennes farm, wheat upon wheat, pease upon pease, and beet-root upon beet-root; and he entertains no doubt that he could continue to do so for an indefinite period, the only condition necessary to be fulfilled being — to return to the soil, in sufficient proportion, the four fundamental elements above named.

"Suppose we wished to cultivate wheat indefinitely. We should at first have recourse to the complete manure, and afterwards administer only the *dominant* element, or nitrogenous matter, until a decrease in the successive crops showed that this culture had absorbed all the phosphate of lime and potassa. As soon as a diminution in the crops manifests itself, we must return to the complete manure, and proceed as before.

"Suppose that, instead of an exclusive culture, it be desired to introduce an alternate culture in a given field. We commence with the agent that has most influence on the plant with which we start. If that be a leguminous plant, we at first administer only potassa. For wheat, we should add nitrogenous matters. If we conclude with turnips, we have recourse to phosphate of lime; but when we return to the point from which we started, all four elements must be employed.

"As may be seen, this system differs radically from that hitherto adopted. It has not for its basis a complex manure administered to the soil by wholesale, in which we endeavor to turn all its constituents to account by a succession of different crops. In M. Ville's system, he supplies to the soil only the four governing agents of production, which are added gradually, one after another, and in such manner as to supply each kind of crop with the agent that assures the maximum yield."

The translator does not speak of, nor does the text relate to, the other essentials of farming in regard to drainage, quality of soil, and the necessity of fermenting manures, as a sort of yeast, to induce in the earth that fermentation which quickens vegetation so much. It will not supplant other manures; it comes in aid of them, and supplies the want of them, when they are not present. All farmers are well aware that certain soils require perfectly raw manure to create fermentation in the soil. Stiff clay is amended best in that way.

Professor Ville finds by experiment another proposition to be true, which surprised me; I am not farmer enough to be able to say too, it will surprise other farmers. Ever since the alkalies, potash and soda, were found to replace each other in the arts, they have been supposed to have the same effect in agriculture. Prof. Ville finds not only that that is not true, but he insists that potash, if it is used, must be in the form of carbonate of potash; that in any other form it does not have the proper effect upon vegetation, until, in the course of decomposition and changes in the earth, it ultimately becomes carbonate of potash.

I invite your attention further upon this matter only to the harvest of 1864, upon the experimental farm of Vincennes.

"On the 31st of July, M. George Ville reaped and thrashed his crops in presence of a large concourse of agriculturists. The results were as follows:—

WHEAT.—*Third crop from the same land, without fresh manure since the first application.*

Crop per acre.	Without manure.	With complete manure.
Straw, ...	704 lbs.	5,913 lbs.
Grain, ...	193 "	2,464 "
Total, . . .	897 lbs.	8,377 lbs.

WHEAT.—*Fourth crop, without fresh manure since the first.*

Crop per acre.	Without manure.	With complete manure.
Straw, ...	1,074 lbs.	4,629 lbs.
Grain, ...	316 "	1,760 "
Total, . . .	1,390 lbs.	6,389 lbs.

COLZA.—*Coming after two crops of Barley, without fresh manure.*

Crop per acre.	Without manure.	With complete manure.
Straw and silicates, .	5,632 lbs.	7,700 lbs.
Grain, ...	1,320 "	2,410 "
Total, . . .	6,952 lbs.	10,110 lbs.

The beet-root crop was 22,748 pounds, leaves and roots, without manure, and 31,608 pounds with complete manure. He states, in another connection, let me say, that the manufacturers of beet sugar had found, that by reducing the remaining pulp to potash, they greatly increased their profits, and that habit prevailed somewhat extensively; but in every case it was found that what actually went back to the ground lessened the crop so largely, as a consequence of the exhaustion of the potash, as to bring the product down to a point that did not pay a profit, and they had to give up their potash and go back to the old system, in order to keep up the fertility of the soil. It is, I believe, an established fact in all root-culture, that if the waste is carried back to the soil, after having been fed to cattle, the crop not only is not reduced, but in many instances increased. That is one strong proof of the necessity of potash, and of the folly of abstracting it, in any form, where we can possibly avoid it, from the soil.

Prof. Ville gives a formula of the proper quantities of these various elements to make a full crop. These tables are of great interest, but as they can be examined at your leisure, I will not trouble you with them.

All this does not change, in any degree, the necessity of a fertile soil. It does not qualify the soil itself; it only enables you to get crops upon any soil. Many other matters come into the problem also, as the effect of sunshine and climate and season, and the capacity of the soil to hold moisture in the proper quanity for the growing plant. All these are agricultural propositions which are not disturbed by these results.

Prof. Ville's experiments led him very strongly to the conclusion that the plant does obtain nitrogen from the atmosphere when in a state of vigorous growth. He has made some very curious experiments of that nature, which are worthy the examination of intelligent cultivators. If that be true, plants are not so wholly dependent upon the putrefaction of vegetable and animal substances for the nitrogen necessary to their growth as has been supposed.

He publishes a table of the four agents contained in the crops, and in the complete manure, per acre:—

		Weight of the crops dried, lbs.	Nitrogen, lbs.	Phosphoric acid, lbs.	Potassa, lbs.	Lime, lbs.
1861.	Spring wheat, .	6.080	73.03	26.36	38.02	17.80
	Beet-root, . . .	8.972	289.53	46.59	134.21	67.56
	Barley, . . .	7.058	108.89	33.22	72.06	35.86
	Pease, . . .	5.145	148.17	35.60	82.39	112.93
	Complete manure, .	–	153.10	176.00	176.00	176.00

So that the complete manure contained, in this case, for these four crops, 153 pounds of nitrogen, 176 pounds of phosphoric acid, 176 pounds of potassa, and 176 pounds of lime: the nitrogen being in the state of nitrate of soda or of sal ammoniac; the phosphoric acid in the state of phosphate of lime; the potassa in the state of carbonate of potassa; and the lime in a caustic state.

If, then, we shall have found, in this way, the key to the new husbandry, science will have at last unlocked that secret arcana which we have never yet been able to reach. All of us know with what hope all intelligent farmers, in this country and in Europe, turned to those scientific propositions issued by the eminent chemists of Europe which seemed likely to lead to a truly scientific and improved agriculture, whereby crops could be increased, and the result made a sure one. After many years, the results were found to be so uncertain in the way of guidance, that intelligent farmers laid away their books, and turned away from agricultural chemistry and the science of agriculture as matters fit only for scholars to dispute about, and went back to their practice. But if, as now seems likely, we have found a truly scientific method, by the application of which we can make certain the crops which we desire to raise, we shall enter upon a new era, and the results must be magnificent.

The diversified industries of Massachusetts lead to great wealth, but, after all, our prosperity really rests upon agriculture, and I cannot but think that we are not doing all that we might in the way of supplying ourselves with the leading articles of consumption, instead of buying from the West. There was a time, indeed, when they were purely agricultural, and we were largely manufacturing; we sold them our manufactures, and bought their breadstuffs, and there was a reciprocal benefit in it. But they buy less and less in proportion to their population, continually, but we have to buy more and more from them, for the habit has grown upon us, and we do not raise our own breadstuffs. Massachusetts must pay twenty-five or thirty millions annually for breadstuffs. I have shown you that you can raise wheat in Massachusetts; and if every farmer would lay down a single acre to wheat, and let it go into his rotation, it would save a great deal of money to the State. There seems to be no difficulty in doing it. There is a gentleman before me who has raised here in Concord some of the whitest and finest wheat that has been seen anywhere, and he does not find any difficulty in doing it on our light soil. If we are to go into an intelligent cultivation of the soil, which is the real basis of scientific agriculture, it seems to me a necessity that we should raise our own breadstuffs.

With these few remarks, which only the necessity of the case has called forth, I ask you to nominate a chairman for this afternoon.

Dr. GEORGE B. LORING, of Salem, was nominated as Chairman, and the Board took a recess, until 2 o'clock, P. M.

AFTERNOON SESSION.

The Board was called to order at the hour appointed by the Chairman, the topic assigned for discussion being Cattle Husbandry.

The CHAIRMAN. I have been requested to preside this afternoon, gentlemen, and I am sorry to say, that one object in making the selection, according to the declaration of the committee, was, that I might open the debate on Cattle Husbandry. Some one said, after a long debate at one of the finest agricultural exhibitions ever held in New England, —the discussions at which some of you may remember,—that the fault of the chairman was, that he talked too much; that he did not know how to run an agricultural exhibition, because he was too much given to talk. I do not know but that may be the case; the charge was preferred against me rather sharply; but I have never yet repented of the course I pursued on that occasion; and considering the fact that the committee were somewhat solicitous that I should open this meeting with similar talk, I do not propose to be governed by that warning at all, but to do what I can, in the best way I can, to commence the discussion upon this important question. I know, and you know, that it is the opening of a debate or a discussion which gives it character and importance. All that the opening speech contains may not be true, it may all be false; but whether it is true or false, the more thorough and declared it is, the better opportunity it gives the meeting for discussion after it is over.

Now, this question of cattle husbandry is unquestionably the most important question that can be brought before an agricultural assembly. It lies at the foundation of our whole business of farming. There may be those who are engaged in the raising of root-crops, those who are engaged in the raising of tobacco, those who are engaged in market-gardening, so-called, those who are engaged in the raising of grass for sale in the market as hay, but go where you will, the bottom of the whole business is the condition, the quality and the utility of the cattle that are used in every district. From them comes, mainly, the best quality of manure that we can use. Every man who is accustomed to cultivate the soil, and cultivate it well, knows that his cattle really are the sources from which he can derive the best fertilizers for his soil; and they are the sources of the production of meat for the market, and of all the products of the dairy; and I say the production of all these things really lies at the foundation of almost all the most successful branches of farming.

When we remember all this, we must be aware that the whole business of cattle husbandry differs as localities differ. To one man, cattle husbandry means the breeding of animals of a certain description for specific purposes up to the highest standard of which they are capable. To the Scotchman, it means the breeding of Ayrshires for milk and cheese. To the Englishman, it means the breeding of Shorthorns and Herefords and Devons, for the purposes of meat. To the channel islander, it means the production of a choice and carefully selected herd of cattle, for the purposes of the dairy alone, and not, as those of you who know the channel islander well, understand, for the purposes of meat. So that in one case, cattle husbandry means breeding, with all the nice laws that control that business; in another case, cattle husbandry means merely the selection of proper animals for feeding during the winter, or pasturing during the summer; in another case, cattle husbandry means the selection of cows for the dairy, either for the summer dairy alone, or for the production of milk during all the months of the year. So that cattle husbandry really means the selection, the breeding, and the feeding of cattle.

In the first place, in regard to selection. Are there any rules by which we can be guided in the choice of animals for our farm? One man lives upon a clay soil, his land is adapted to the production of grass and root-crops, and is situated near a large city, where he has a market for milk. His business seems to be one thing, and he selects animals that are adapted to the purpose of supplying that market with milk, and with that alone; and his object is to select cattle that can be wintered upon his land. Another man lives upon a hilly pasture, remote from market. His lands furnish rich, sweet pasturage, and the selection of animals with him is a different thing. And so each man, each farm, each county, each State, at any rate, each section of our country, requires a different selection of animals; one for one purpose, another for another purpose.

I find, in looking over the statistics of the cattle of the United States, that notwithstanding the vast amount of meat that is produced in many sections, the percentage of cows predominates very largely, in the New England States, over that of all other cattle; I mean, over oxen and steers, and other cattle that are kept for stores; and it is so in New York State, in the Middle States, and even in the Southern and many of the South-western States, where we are in the habit of thinking that meat alone is the great product of the farm. It seems to me, therefore, especially important that the American, and particularly the New England farmer, should select cattle that are specially adapted to the dairy; perhaps not for that alone, but mainly for that, so that when the production of meat is unremunerative, he will be able to resort to the dairy as the means from which he can run his farm.

Now, it is a very curious fact that there is no breed of cattle universally adapted to any large tract of territory. We are led to suppose that the Shorthorns are adapted to all parts of England; but it is not so. Some of the most careful and accurate English farmers will tell you that it is impossible to raise Shorthorns in their region. A most intelligent gentleman from Bruton, in Somerset, called on me the other day, who is a breeder of Herefords, his father, who occupies the farm adjoining, being a breeder of Devons, and when I spoke of raising Shorthorns, he said: "The thing is impossible in Somerset." And yet that man was breeding and feeding cattle simply and solely for the production of meat. It is only in particular localities in England that the Ayrshire, the West Highlander and other breeds of that description are produced. Knowing the fact, that even on that small island it is impossible to find any one breed of cattle adapted to the whole business of farming there, how can we expect to find a breed adapted to any one purpose in all sections of this country? The thing is impossible. There is a gentleman in Essex County who, forty years ago, imported Shorthorns, and they failed entirely; while at the same time the farmers on the Connecticut River breed them without difficulty, and have the best herds of cattle in New England. So the Shorthorn went into some of the rich fields of Maine, and into some of the fine pastures of New Hampshire, and did well. But even that breed, with all the care with which they have been long bred, are not universally adapted to the purposes of farming. Neither is the Ayrshire, which really stands next in the scale of artificial breeding for agricultural purposes. I put the Shorthorn first, because there is no doubt that the Shorthorn is the development of more care, more skill and more intelligence, as a uniform breed of cattle, than any other breed in the world. Next to that, I say, stands the Ayrshire. Now the Ayrshire, valuable as it is for dairy purposes in Scotland and in many parts of New England, does not seem to be equally valuable in all sections. Carried down into the southern counties, where the pasturage is richer and stronger, it does not do so well as on the hilly pastures of Scotland. In Maryland it does not do so well as here. It takes on more bone and a larger growth of flesh, but it does that at the expense of the dairy qualities for which it is especially valuable in this section, where it is particularly appropriate.

What shall we do, then? One man tells you that the Shorthorn is the best animal he can breed, and why. Another man tells you the Ayrshire is the best animal for him. Another man says that he wouldn't own a farm that did not have a Jersey cow on it; yellow butter, not much of it, but good; he wouldn't have a farm without a Jersey cow. Another man tells you he wouldn't give sixpence for a farm if it wasn't stocked with handsome, straight-bodied, nice-horned, rich-colored Devons. Another man must see a white-faced Hereford looking over his fence before he has any agricultural peace in his soul. What, I repeat, are we to do? I suppose the only rule we can adopt is for every man to learn the quality and capacity of his farm, and then make his selection.

Now, if I were to tell you that there was any farmer in Massachusetts who owned 520 acres of land, and the best land in the Commonwealth, who is capable of making meat here for the market, and make money enough from it to support his family and educate his children, you would be astonished. As a general rule, it is said that no man can feed beef to a profit in Massachusetts; and yet, right in the most expensive districts of Massachusetts, where farmers are obliged to pay large rents for their lands, high prices for grain, and from $70 to $80 a ton for their oil cake, farmers are making the largest profits of any in the world, almost, simply by the production of beef on their farms. They know it; they understand how it is done; they have ascertained the rule by which a pound of beef can be made more cheaply than by any other rule, and they make money on their farms in that way. They have selected cattle for that purpose. It would be folly and nonsense for them to go into that business and get a stock of Ayrshires and expect to turn them into beef profitably, where they are making Hereford and Devon beef to a profit. No Massachusetts farmer upon the hillsides of Berkshire would think of undertaking to raise a herd of Jersey cows simply for the purpose of supplying a few wealthy customers with choice butter at seventy-five cents or a dollar a pound. The transportation of the butter interferes with the profit of the product; it is impossible for him, and he must turn his attention to something else—perhaps the manufacture of cheese—as the great source of profit on his farm, and he secures animals adapted to that. Situated as I am near a city, where every quart of milk I make is really made to a profit—a small one, to be sure—it is idle for me to raise Shorthorns to produce meat. My pastures are short and sweet, very well adapted to run dairy cows, and the market being close at hand, I am able to make a profit from those cows. So, I say, every man must be governed by the locality in which he lives, and the quality and capacity of his farm in making his selection.

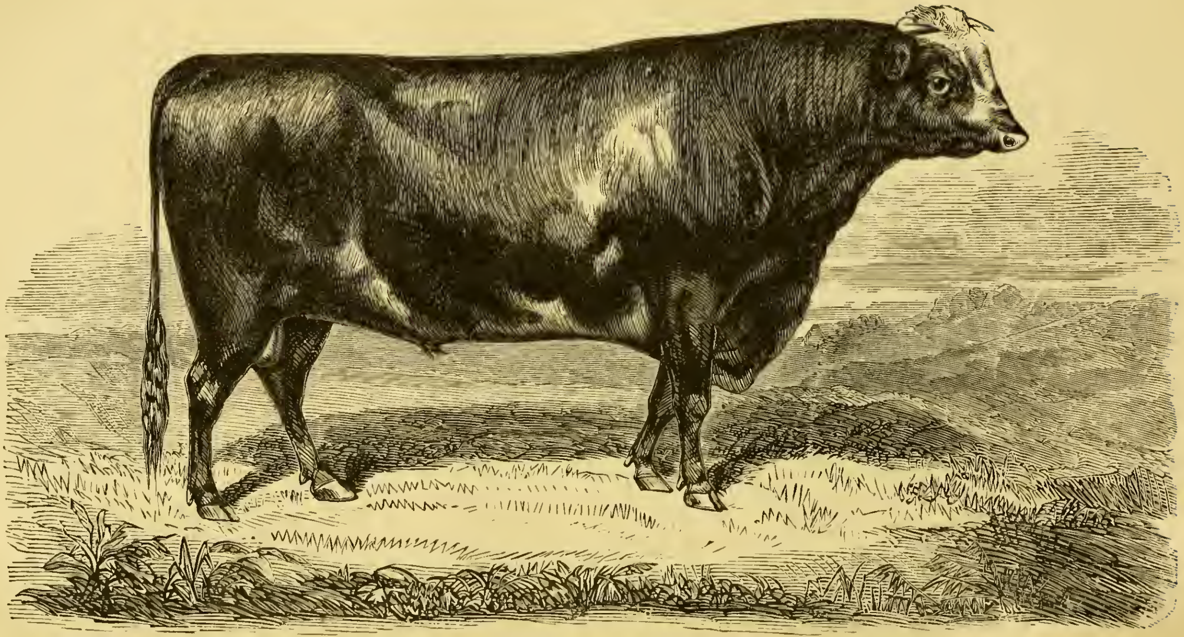
Now this selection is not by any manner of means an easy thing. It is not every man who can tell what he needs in an animal for beef, for butter, for milk; you have got to be governed by nice rules in all that business. I insist upon that. The man who can go into a stable or barn or into a pasture and select from a herd of cattle the best animal to put into the stall, the best cow for the production of milk, that man has cultivated his powers of perception and judgment up to a point unequalled by almost any other person in the world. It is astonishing how quick, accurate, careful, precise, a man's eye has got to be in order to settle that question. It is astonishing how few of us have reached that point. You may talk about the exquisite skill with which the manufacturer changes the colors of his warp and woof, and all that, but I have never seen any men with sharper perceptive faculties than the men who have been successful in the selection of animals.

Now the question comes back to the question of breeding. I said in the beginning that one part of the business was the breeding of animals; how you can breed animals adapted to a certain purpose. You can purchase them in the market, if your eyes are sharp enough and your purse long enough; but how are you going to breed them so as to have a better herd than your neighbor, or so as to transmit the good qualities of your own herd. In the first place, having ascertained for what capacities your herd is intended, the business of breeding is just as simple, plain and straightforward as the business of ploughing or manufacturing. It only requires this: that the females should be properly selected; always taking it for granted that the female will be influenced to a very great extent by the first male which impregnates her. Always take care, if you desire a certain specific type of animal, to begin with the females in your own herd, and take them from no other. They should be stamped there, and you will never have regularity and uniformity in your herd until you are careful of the first impregnation of your female animal.

If you are breeding for beef, you are doing what is a simple, plain, straight-forward business. The female selected for that purpose should be of a certain description, well known to all farmers. Round-bodied, fine-boned, clean-headed, straight in the back, straight in the rump, sharp, clean chine, good depth through the heart, and a solid, firm, substantial brisket; a firm leg to walk upon; a good, ample, luxurious mouth; the expression of a good feeding animal is always seen in the mouth and in that part of the head which is devoted to the business of feeding. All these points, added to a good mellow skin, should always belong to the female out of which you intend to breed a herd of cattle for the purposes of feeding.

For the purposes of the dairy, the cow unquestionably should be of a different character. Somewhat deeper, less round in the body, with a rib flat,—I do not mean dropping flat, but a flat surface, with sharp edges,—springing gracefully from the spine; loose shoulder, straight quarter, good lap, broad back, great depth of carcase; and with all that, a certain elasticity to the touch which carries with it the impression of great secretory functions. These are the things (with superficial veins, and everything of that description) that you want in a female for the purposes of the dairy, and at the same time, that description of head of which I have spoken as belonging to a beef-producing animal.

With respect to the males the rule is,—notwithstanding what is said with regard to the resemblance of the male to the female,—that the male should present precisely the same points as the female, except in a masculine degree. No female headed bulls for me. Talk about a bull that has a feminine head upon him! You might just as well talk about a man with a woman's head on his shoulders. You want in the male of the breed of animals that you are undertaking to produce to kill, every thing that is in the female, double-distilled, multiplied tenfold, because it is from the male side that the whole vigor and power and force of an animal comes, after all. So, when I describe a cow for the purpose of meat production, and a cow for the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"HONEST JOHN,"—Ayrshire,—owned by WILLIAM BIRNIE, Springfield. See Preface to Abstract.

purpose of the dairy, I always describe the bull as having the same points, for the same purpose only added to, multiplied and increased so as to make the animal strong and masculine.

There you have your male and female, and once having put these two animals together, if either one is up to the point you desire, do not abandon that line of breeding, and go out of it into other herds for the purposes of increase. This business of mixing animals—of turning one herd in with another—is all idle and nonsense; it is nothing but "confusion worse confounded." The best herds of Shorthorns ever produced have been produced by a careful adherence to this rule, after bringing it to the type desired. The most remarkable breed of sheep have been produced in the same manner, and the best breeds of horses have been produced in the same manner. All the prejudices against in-and-in breeding have long since vanished before a skilful, careful and accurate mode of breeding. Feed well and breed closely, and you can make the type you want.

Now, after having produced these animals—after having brought them into your herd and established them—the next question is, How are you going to take care of them? What are you going to do with them? How are you going to feed them? The business of feeding animals is not an easy thing. It is not every man who can take care of a cow after he has got one. It is not every man who knows how to feed an animal, no matter how thrifty he may be. One feeder will take ten oxen, and make money on them; another feeder will take ten more, of the same kind, give them the same food, and lose money on them. Why is it? One reason is rather a sentimental one, I grant you: it is that one puts himself in sympathy with his herd, and the other does not. It sounds sentimental, but it is true. Cattle are just like men; they will take readily, gratefully, from one man's hands, and indifferently from another. The first thing, then, in beginning to feed animals, is to put yourself in communication with them, somehow or other, the best way you can, and then begin to feed them. If you feed them right, there is no trouble. For the purposes of the dairy, for carrying cows through the winter, I have no question that in this country, the best kinds of food, in the hands of a proper and judicious feeder, are the best English hay, some form of root-crops, and any kind of grain that is deficient in oil. You can feed a cow upon good English hay unquestionably well, with the addition of mangolds or swedes, say half a bushel a day, more or less, according to her size, with fine feed, or oatmeal, and perhaps a little rye meal; but not corn meal nor yellow cake for a dairy cow. It is like brandy and water for little boys.

Nothing will tear a dairy cow to pieces so fast as cotton-seed meal. So I say, good English hay, corn-fodder, if you have got it, softened a little with warm water or steam, roots and fine feed, or oatmeal. Why is this? Why avoid those oily substances, oil cake and cotton-seed or corn meal? Simply because they all serve to stimulate to a feverish condition that delicate organization of the cow, by which she makes her milk. I say, that delicate organization, because there is no living organization, except that of the human brain, that I know of, that is so delicate in all its structure as the lacteal system of a cow that is brought up to the best standard of a dairy cow. It is more easily thrown out of order than any other. It is a little too hot, or a little too cold, the wind blows from the north-east or the south-east, and your cow feels it. Every man knows this. There comes up a shower, and a clap of thunder scares her half to death; she comes home at night, and your pail is half full. Do you suppose that an economy like that, which depends upon the nice organization of all the tissues, and nerves and veins, cannot be easily thrown out of order? Certainly it can. The oleaginous matter contained in cotton-seed meal throws that whole system into such a feverish state that your cow is utterly destroyed in the course of time. This is true, not only in this country, but all the testimony I have had from breeders abroad shows the same thing; and I warn all men who have dairy cows to avoid the feeding of these stimulating, oleaginous preparations, that serve to put the system into a feverish condition. In feeding for beef, it is another thing. Plenty of food, properly given, at proper times, not too much nor too little, always studying the capacity of the animal, with the ability to know whether an animal is thriving or not, I think is the proper way to feed an animal for the purpose of producing beef; remembering, at the same time, that there is such a thing as too much feeding for profit, as well as too little feeding; and he who knows his animal well enough, who has put himself in sympathy with him enough to know what his capacity for food is, will know when he is feeding him to advantage, and putting money into his own pocket.

Now, to manage all these matters carefully which I have hastily gone over, it seems to me that we require, in this country, a more accurate and careful study of the animal kingdom than we have been accustomed to. I know there are men in New England—I see them here in this room—on whose judgment in the selection of animals I should rely implicitly. I should have no question about it—not the slightest. But how many men there are in this State and in other States raising herds who know nothing about it? You put them into a herd and they look on in a sort of wholesale admiration. If the cattle are colored well, they admire them; and if they are big enough they admire them; the bigger they are the better they like them. If they are handsome they like them. But how few men there are who have a careful, accurate, discriminate judgment—who will go along behind your cattle, put their hands on them, and say, "That animal feeds well—that does not; that is intended for a good purpose—that for a bad one." Now we have got to learn that in some way, or our young men cannot run their farms to a profit. I know some young men who can do it—who have learned the rules by which they can do it—on their fathers' farms; but we have not brought our agricultural education to that high standard which will enable every man, and especially every young man, to exercise this discriminating judgment. I met young men in England who carried on their farms to a profit; but they had evidently been schooled with the utmost care in regard to all these points.

Now it seems to me that one of the most important branches of education which we have before us, is that kind of education which will enable a man to judge well of the animal kingdom; to judge well of the cattle he is to have on his farm; to judge well of his herds—how to breed them and feed them; to judge well how to deal with even the vermin on his farm—the canker-worms, the caterpillars, rats and mice—the whole animal kingdom. It does seem to me, that one of the most important branches of all agricultural education is a thorough knowledge of the animal economy; in other words, of the natural history of the farm; that sort of knowledge which will make a man familiar with the natural history of the farm which he is cultivating; which will enable him to understand his domestic animals and wild animals, and enable him to put his eyes on the various kinds of plants that are growing there, and judge of their capacity, and judge of it well. I think, therefore, one of the most important points of agricultural education in which this Board can possibly engage, is the careful and accurate study of all the natural history of the farm. And I come to that naturally, after having discussed the business of selecting, breeding and feeding the animals that live upon the farm; for how can we select animals properly unless we have an accurate knowledge of their whole animal structure? We must have it, either by instinct or by careful study. How can we judge of the best modes of breeding, unless we have carefully and accurately investigated the laws which control breeding, by which we can arrive at the results we desire? How can we best judge of the condition of our pasture lands and our grass lands, unless we know well, by accurate and careful study, what plants are most nutritious, and what of the least use, and how to get rid of bad ones, and how to cultivate good ones? Is there anything the farmer desires to know more than how he can rid himself of the insect pests of his farm, which invade his orchards, and his grain crops, and his grass crops; which are above ground and under the ground, and invade him in the dry season and in the wet season, and are really the cause of more expense than all his family expenses, year in and year out? Now, when I say to you that this whole matter rolls in upon us under the head of a careful and accurate knowledge of the natural history of the farm, you will then understand the vast importance that I put upon it; and I trust that in discussing this question of cattle husbandry, as part of the business of farming, there are those here who will open this whole question of the education of the mind of the farmer upon the natural history of the farm.

Now, gentlemen, the question is open for you to discuss. I think I have laid out ground enough. I have made as many points as I possibly could in a short discourse. I leave it for the meeting to take them up, one after the other, and debate them.

WILLIAM BIRNIE, of Springfield. Speaking of this matter of agricultural education, I attended a cattle show last fall, some fifty miles from here, and heard a man who had been governor of the State, and is now a member of Congress, [Hon. George S. Boutwell,] say that all this matter of agricultural education was mere nonsense. He stated that he had always said that the Agricultural College would be a failure; it could not succeed, in the nature of things, for as soon as you educated a boy he would leave the farm. Consequently, the conclusion he came to was, that all the education a farmer got he would have to get at the tail of the plough—or words to that effect. I never was so much astonished in my life. I supposed it was some badly reconstructed rebel. I have heard such doctrines down South—that as soon as you educated labor you destroyed it for agricultural purposes. The doctrine there has been, "Keep all education away from the laborer; you can manage him better." I suppose that was the theory of the ex-governor—that you could manage the agricultural population better by denying them education. But from the remarks I have heard this morning, I should judge that education was necessary even for the farmer. Mr. Bull says that a knowledge of chemistry is necessary; that chemistry would tell us what it is best to raise, and all that. But I would not advise any farmer to go home and sell his cattle. I think our most reliable source for manure, (notwithstanding what we may derive from chemical sources,) is found in cattle. I think the experience of every farmer here will bear me out in saying, that only in those regions of country where the largest number of cattle have been maintained have they been able to keep up the fertility of their soil. We find that in the great grain-growing sections the wheat crop has fallen off largely, while the product of the dairy has kept pace with the population. All through the State of New York we find that the wheat-producing sections have fallen off in their production a great many bushels to the acre, while the dairy-producing sections have constantly increased their product. That State produces one-quarter of all the butter and one-third of all the cheese produced in the United States, but very much less wheat than fifteen years ago. I think these facts are very strong arguments in favor of keeping cattle, and I find that New England farmers have profited by that experience. We find the cows in Massachusetts increasing steadily at the rate of 1,400 a year, right along, while I have no doubt that our production of grain has fallen off very much of late years.

Dr. Loring has told us the method of selecting the best kinds of cattle for our different localities. I do not suppose I can say anything to improve upon what he has said, as to the importance of care in feeding them and in breeding them. I find most agricultural societies even now offering premiums for grade bulls. It is astonishing to see a miserable black bull take a premium at a cattle show, with no pretence that the blood was worthy of notice at all. Now, I maintain that the only method of improving our stock of cattle is by using males of some one of the improved breeds. I think wherever you find an improved bull, of what breed you please, you will find a decided improvement in the stock of that section. If you have a cow for sale that had an Ayrshire, or Shorthorn, or Alderney bull for her father, you would not hesitate to ask ten or fifteen dollars more for her than for an ordinary, native cow; you would maintain she was all that better, and no doubt she would be. Well, if we can increase the value of our stock five dollars a head, we have 240,000 head of cattle in Massachusetts, and you see what an addition it would be to the agricultural wealth of the State. And if we did that, we should increase the annual product of those animals to a like amount.

I am satisfied that for Massachusetts, for dairy purposes, the Ayrshire cow, as the doctor has told you, is the animal. There are some localities, undoubtedly, where the Shorthorns will thrive; but for dairy purposes, in Massachusetts, the Ayrshire is the animal; and if we can improve the milking qualities of our cows by the introduction of the Ayrshire stock, why do we hesitate to do it? If we get them, then the question is, how shall we feed them? I think there is a point where more is lost in Massachusetts, than even in breeding these native animals, if you choose to call them so. I have not the least doubt, that ten or fifteen per cent. of the food given to cattle in Massachusetts is wasted, trodden under foot, thrown away; and there is no one point where our farmers can improve so much as in the feeding of their cattle. I do not pretend to say what the method should be, but there is a general carelessness, a general want of economy. And I agree with the doctor in what he says in relation to the kinds of food. I have never used much cotton-seed meal, but I am satisfied that Indian meal is not the kind of feed for cows. In my experience, rye or wheat bran produces very much better results than corn meal.

CHARLES L. FLINT. It is well known to most farmers present, that Mr. Birnie has experimented somewhat extensively upon the methods of feeding stock, and I think when his methods are studied carefully, it will be admitted that they are judicious. At any rate, he has arrived at some satisfactory conclusions in his own mind in reference to the preparation of food for dairy cows. I think it would be exceedingly instructive and agreeable to everybody present to have him state, somewhat in detail, the results, and his conclusions from his experiments in the steaming and preparation of cattle food.

Mr. BIRNIE. I am not prepared to give any detailed account, so far as respects weights and measures. It is well known that I have practised steaming the food for my cattle for ten or eleven years, and I am satisfied that I save more than twenty-five per cent. by doing it, though I am sorry to say that very few of my neighbors have adopted it, but some have, with satisfactory results; and I notice that a gentleman in the State of New York has given some very satisfactory account of his experiments in that line.

I cut and steam almost all my fodder, feeding twice a day with steamed food, and in the middle of the day with dry hay. Corn stalks, rye straw, bog hay, anything I happen to have in the way of coarse fodder, is cut and mixed with English hay—perhaps one-half of the whole mess is good hay, the balance is a mixture of the coarse fodder, with a little rye or wheat bran. It is put through the cutting machine, then put into the steam-box and steamed, and fed warm;—taking care to keep my cattle warm in the meantime. I make my stable just as warm and comfortable as I can, and never let my cattle out, except on warm days, when the sun is shining warm. Water is carried into the stable, so that they can drink without going out. Sometimes, in the coldest weather, they do not go out for a fortnight. I think that is the better way, for turning them out to exercise don't amount to anything. Turn a cow out into the yard on a cold day, and she will stand in the same spot for hours, unless you force her to move. Consequently, I do not let my cattle out unless the weather is very pleasant.

I steam twice a week. I put into my steam-box about fourteen hundred pounds of good hay, corn stalks or rye straw, and one hundred pounds of wheat bran. That feeds all my stock twice a day for three days and a half. I have forty-two cows and animals that are over one year old; six horses and ten head of cattle younger than that. They are all fed out of the steam-box, the horses getting a little in addition—bran when they are not at work, meal when they are at work. I find that quite young colts eat it eagerly. In the middle of the day they have about one hundred and fifty pounds of hay. So that about five hundred pounds of good hay and fourteen hundred pounds of steamed fodder last that whole stock three days and a half.

In putting the fodder into the box, I intend to put in just as much water as I can make it carry, the object being to make it absorb as much water as possible, and reduce the mass to as soft, pulpy state as possible. Of course my apparatus does not admit of much pressure, and I boil as long as possible.

Professor Agassiz. Do you not lose a good deal of the water which has been mixed with the food?

Mr. Birnie. Not much. Sometimes there is a little leaks out, and I have arranged to save that. I do not allow that to go to waste. Whatever is not eaten is collected and thrown in again. Sometimes, for a cow that is fresh in milk, I throw in a little oatmeal; but I usually intend to feed my milch cows half a bushel of mangold wurzels each a day.

A Member. How large is your steam-box?

Mr. Birnie. Six feet square and about seven feet deep. I have cultivated cabbage for a number of years for the purpose of feeding it to my milch cows, and I feed it largely. I know the theory has been that cabbage would taste in the milk, but I have heard no complaint from my customers of that kind. I give my cows as much as they will eat. I have found no green feed that will put flesh on cows like cabbage; consequently, I cultivate several acres for the purpose of feeding to my cows. After the cabbage is gone I feed mangolds.

A Member. Do you steam those roots?

Mr. Birnie. No, sir. I have, but it requires a great deal of labor, and I was not satisfied that there was sufficient advantage to compensate for it.

A MEMBER. About how much hay do you consider enough per day for a common milch cow?

Mr. BIRNIE. I do not mean to give them more than two or three pounds of hay, in addition to the steamed food.

A MEMBER. About how much do you allow each cow, of the steamed food?

Mr. BIRNIE. I give them about two bushels each, varying according to size and condition.

A MEMBER. You do not exceed twenty pounds?

Mr. BIRNIE. Not near so much. I don't think they get fifteen pounds. I find horses grow very finely and colts thrive upon it. They will leave nice English hay to get it.

Dr. LORING. Some very curious experiments have been made by Mr. Mechi, with regard to steaming food, agreeing very much with Mr. Birnie's statement. He says that his horses were never in better condition than when he fed them on steamed food. The only reason he ever abandoned it was, that his foreman was unwilling to go into the labor of steaming. His testimony is very strongly in favor of steaming. I have tried steaming myself a good deal, and agree with Mr. Birnie, except in one particular, on which he does not seem to have dwelt, and that is, the expediency of steaming good hay. I have not found that it improved the quality or nutritive properties of English hay,—the best hay,—to subject it to the process of steaming; I have thought it injured it. But corn fodder, coarse straw, coarse meadow hay, everything of that description, is undoubtedly brought into a better condition, as nutritive substances, by cooking, than without. I have no doubt of it at all.

With regard to the cooking of roots, the Board will find some very curious experiments recorded in an essay printed in the Secretary's Report of 1861. They were selected by myself from some experiments carefully made in Scotland, to test the comparative value of steamed and raw roots as food for cattle. The testimony there is very strongly against cooking roots for feeding cattle.

Mr. BIRNIE. You will find a very good article on this subject of steaming food in the last United States Agricultural Report, by Mr. Stewart, of New York. He goes into the matter very fully, and states that there is a saving of more than thirty per cent. I have no doubt that he is very nearly right. His cattle look better, their hair lies smoother, they are better in every way. I differ from the doctor in regard to the effect of steaming on English hay. I think it improves it. It seems to soften the woody fibre and disengage the aromatic oils. Where I mix it with the other feed, I find it flavors the whole mass. The odor of the hay seems to penetrate the whole mass. Coarser fodder, musty hay, that cattle would reject at once, will be eaten by them with avidity, after it has been put into the steam-box. It seems to destroy the musty flavor at once.

Professor AGASSIZ. It must save the secretion of saliva to an enormous extent, and therefore relieve the animal from a physiological labor which is very manifest. I have no doubt that that must be the chief cause of the relief to the cattle, because dry food must be softened in order to be digested; and it must be done by the secretions of the mouth—by the secretory surfaces of the alimentary canal, and, in fact, by all the secretory surfaces of the digestive apparatus. Now, where does that come from? From the blood; and if you supply the food so far softened that the animal is relieved from that physiological labor, you place your animal in a much better condition for its work. I have no doubt that there is the explanation of your results—that your steam performs a part of the operation which your animal has to do itself by its secretions.

Dr. LORING. I should have mentioned that, but I did not, because I once said it at an agricultural exhibition at Newburyport, and was ridiculed for stating that it was worth while to save animals labor in feeding.

Professor AGASSIZ. If Newburyport is ignorant, it is no reason why the fact should not be repeated here.

Mr. BIRNIE. Speaking of steaming roots, I will say that one winter I cooked my mangold wurzels for a long time. I found that in boiling them they gave out a great quantity of water, and I had no convenient method of utilizing this water. It discharged into the barn cellar. I had some pigs there, and I found they drank it quite greedily. I tasted it and found it quite sweet, and made up my mind that I was losing all my sugar, and gave it up. I now cut them fine and feed them raw.

Mr. Hubbard. When we get something new before the Board, we generally consider the one who introduces it as a witness. I would like to question Mr. Birnie still further, and inquire whether his business is making milk or butter?

Mr. Birnie. Milk.

Mr. Hubbard. Then I would ask if the process of steaming food would be equally beneficial for butter as for milk making?

Mr. Birnie. I have not the least doubt of it. I think Mr. Stewart's business is butter and cheese making. My box, when I first began to steam, held only enough for one day's feeding, and I steamed every day. I did not like to ask my man to work on Sunday, and so I fed cold feed on that day; but I found that one day's feeding of raw and cold food lessened the quantity of milk very considerably. I consequently enlarged my box. I ought to state that my man afterwards volunteered to steam Sunday—he did not like to see the milk fall off—and I paid him extra until I got the box enlarged.

Another point of saving is in keeping up the animal heat. If you draw off a pailful of milk from your cow, of course you reduce the heat of the animal; and then, if you fill her with cold water and cold hay, perhaps, you get her pretty cold. I do not give my cows cold water, but warm it a little, and feed them this warm food—warm as blood—and consequently I return something for the heat which has been drawn away from them. I keep my barn as close as I can, keep my cattle in on cold days, and the result is, that they look quite as well as my neighbors, with very much less expense for food, I know.

Hon. Simon Brown, of Concord. I am very well satisfied, from my own experience in feeding cattle for the last twenty years, and, indeed, nearly all my life, that this subject of cattle husbandry is very imperfectly understood, and the statement of these experiments is exceedingly valuable to us on several accounts, but particularly so because they come from our own people; people who live in our midst; people on whom we can rely as practical men—men who understand their business perhaps as thoroughly as any persons understand their business in this State or country. I have listened, therefore, to these statements with very great interest, and I rise to state a circumstance which transpired a few years ago in the town of Waltham. A friend of mine had seven cows, all valuable animals. He was making milk for the Boston market, and thought he would try the experiment of steaming the food; but as he had no apparatus to do that, he procured a boiler which held two barrels and boiled all the hay that he fed to those seven cows during the entire winter. The statement which he made to me seemed an extraordinary one, but he said that it could be verified by many of the neighbors, who came in often to see his operations. He said that the milk of each cow increased very materially, and continued to hold out during the whole time that he made the experiment; that they ate the hay with great eagerness, and seemed to like the water in which he boiled the hay better than the hay itself. He said that on one occasion a cow drank five common water-pails full of that water in the morning, at one time, pailful after pailful. I stated these facts to the man who purchased the milk and carried it to Boston, who had had a long experience in buying and selling milk, and he said he was aware of the experiments that were going on, and he was ready to state that he never carried so good milk into the city as at the time these experiments were being made; that his customers—who were particular customers, who wanted a good article and were ready to pay liberally for it—sought for it eagerly, and he could not supply the demand.

Now we cannot all go to the expense of purchasing an apparatus for steaming the food for our stock; a great many of us would be glad to do it if we had the means. We are borne down with the cares of the day; we have not the skill or genius to go into this thing; we do not understand how it is done. What is the next best thing we can do? I will tell you what I think it is—and it is not mere theory, for I have practised upon it for a great many years.

In the first place, I have two hay-cutters, of good size, (and I would not recommend any man to buy a small one,) and I cut all my fodder—cornstalks, meadow hay, straw, and everything that I intend to use for feed—several tons at a time. My barn is tight, and it is thrown on the floor, or on a mow, where it is sprinkled over with water; a little salt is added, and it is suffered to remain there two, three or four days, until the whole mass is moist. Then it is overhauled, mixed thoroughly, and any grain which I have to use is mixed up with it. It is suffered to lie twenty-four hours, and then given to the cattle. I have tried that experiment, in contrast with the experiment of feeding long hay and long fodder, and mixing English hay and the poor qualities, and without any accurate experiments, such as weighing or measuring, (which I have not gone into, except in one instance, where I weighed the food given to my horses,) it seems to me that even that cheap and simple process saves about one-quarter of the fodder; and the cattle appear better, even, than they would if the other kind of food was fed out. I have been through that experiment so many times, that I have come to the conclusion that that is the result of that process. I was led to try it by the difficulty of getting hay. Fearing that I should run short one winter, I went to one of my neighbors to purchase some, and he asked such an exorbitant price that I ordered a ton of oats and corn and had them ground together and sent up to me. I then took all my fodder and mixed this meal with it; and instead of falling short of hay, I had a ton or two left, after carrying my stock through completely, and they never did better. I have no doubt that I saved by that operation, after the commencement of the month of February, two or three tons of good hay. We can all do that. We can all purchase a hay-cutter, and can occupy the stormy days of the winter in cutting up the fodder, and carry through our stock for twenty-five per cent. less than in the ordinary way.

Professor Agassiz. May I ask the gentlemen whether, instead of giving their cattle water, they do not sometimes give them a warm infusion of hay as a beverage? We do not always drink clear water when we are thirsty, but occasionally take a glass of wine—when we like it, or approve of it, or we take tea; and that tea helps the constitution, acts as a tonic on the digestion; and I suppose that kind of tea given to cows, instead of clear water, would improve them too.

Mr. Brown. Your question reminds me that I raise all my calves on hay-tea. The calves are taken off after they have sucked two or three times, and as I make butter all the time, summer and winter, the calves are fed with skimmed milk, (what there is to spare,) mixed very largely with tea made of English hay, just as some old women make tea in the teapot. At first, perhaps, there is a pint of milk taken from the cow, put in with the hay-tea, and the man teaches the calves to suck by putting his finger into their mouths; but it is not necessary to do it more than two or three times. They will take the tea very well. I have calves now which are living upon tea made of English hay, and have had nothing else since they were four or five weeks old; and they thrive excellently upon it.

Mr. Bull. It has been suggested that there would be a difficulty in this matter, on the part of farmers who own only two or three cows, on account of the expense of this steaming apparatus. I was much interested in a little invention that I saw not long ago, which consists of a little boiler, with two copper tubes, one inside the other, connected at the end; the fire goes through the middle pipe, the water surrounds that pipe and steam is made very cheaply and quickly. A tube from the steam chamber is led into a barrel or box, into which you have only got to put what you want to cook; and you can, with the least expense, and little trouble, cook a barrel or two of potatoes, or steam a hundred pounds of hay. That would be a very cheap thing for a small farm. I think the whole expense would only be about $15 and it would last a great many years. Half an armful of wood would steam a barrel of potatoes. The cover shuts the steam in, and the succulent root is steamed in an incredibly short time.

Mr. Birnie. There is the Prindle boiler, made of cast iron, which is used quite extensively for such kind of purposes.

Professor Agassiz. Allusion has been made to the desirableness of instruction concerning the natural history of the farm. That is a subject upon which I have reflected a good deal, and with reference to which I should like to make some remarks.

It has been stated this morning—and it is no doubt the impression which everybody has—that science and practice are frequently at loggerheads. I wish, if I can, to help remove the distrust which exists among practical men, with reference to scientific pursuits, because I know that there is no longer any ground for it. I know that scientific men have long known how valuable to progress in their own departments all experience is which they obtain from practical men; and as I have devoted all my life to scientific pursuits, I would, if I could, contribute something towards establishing the proper relations between him who follows the pursuit of what is useful in the closet, and him who follows the same pursuits in the field; for that, I believe, is the only difference between scientific men and practical men—that one does his work in the study, and the other does it in the field. When, this morning, our friend, Mr. Bull, alluded to Prof. Ville, and represented him as a man who had met with the opposition of scientific men, I think there was an impression given which is not altogether correct. I know Prof. Ville. He was a young man, just out of school, when I left Europe, but already aspiring to a position in the scientific world; and he was soon appointed to a position in the Jardin des Plantes. There is no more exclusively scientific institution in the world than the Jardin des Plantes, where he has made all the experiments which have rendered his name famous, and which have shown him to be so highly a practical man, that great reforms even in agriculture are expected from the application of the results he has thus far obtained. I think there can be no better instance of the entire mistake of representing science and the practical purposes of agriculture, or any other pursuit, as in antagonistic relations to one another.

Now, with reference to extending the instruction which science has obtained in relation to domestic animals, in relation to insects injurious to vegetation, in relation to all natural history bearing upon the prosperity of the farm, I feel that we have a duty—that this Board has a duty—which ought not to be left unperformed. There are colleges arising in every part of the United States, the chief object of which is to foster improvements in agriculture. There are many of these institutions which are exclusively agricultural colleges. The pupils of these institutions are to be taught that which will improve their business, and they are to be taught that which will be substantial knowledge. We should have all the experiments of Prof. Ville repeated in these colleges. But that is not all. We should have all the experiments made by Magendie and Boussingault upon the feeding of cattle, upon the nursing of animals; we should have all the experiments made upon breeding, upon crossing breeds, and upon the whole animal economy of the domestic animals. All that should be taught in these colleges, in as advanced, as perfect and as comprehensive a form as the information can be had. Well, we have no teachers competent to do that. You may want to appoint them, but you cannot find them. You must, therefore, (and this is the point to which I want to call your attention,) you must organize something like a normal school to fit teachers to give that kind of instruction in all our agricultural schools and colleges, of which there are already so many that the idea of organizing a normal school to educate teachers in that direction is not out of place—is not disproportioned to the object. I think that this object can be reached sooner than you would anticipate, because you have already more in the way of securing that result than you are aware of. You may remember that eight years ago the State granted $100,000 to build a Museum of Natural History at Cambridge, and by private subscriptions and bequests that amount has been increased to something like $300,000. I have been honored with the direction of that institution, and I have done everything I could to make it what it should be—the nursery of scientific and natural history studies. Let me say, that it is the only institution now in the country where, the whole year round, at all times, there are dissections going on—not of human bodies—that belongs to the medical school—but of animals of all classes ; that there are a few students learning natural history there ; and that, at this moment, the work done in that institution, of which Massachusetts knows very little, has made such a mark in Europe, that yesterday I received a letter from Prof. Leuckardt, one of the leading zoölogists of the day, and editor of the practical scientific journal of Europe, in which, alluding to what has been done in that institution, he says: "The position of America in regard to these matters is really wonderful, and excites my admiration. How miserably small, in comparison with that, appear our university doings and our efforts." That is what a European professor, the head of one of the great European universities, writes respecting one of your institutions, only a few miles from here.

Now, I ask, why does not that institution yield results for home consumption ? Simply because it has not yet the means of sustaining a sufficient number of teachers to enable it to apply its capabilities to that specific object. But suppose that some benevolent individuals, some association like this, or the State, should grant merely the means of appointing one professor of anatomy, applied to the study of domestic animals, and one professor of entomology, applied to agriculture ; the building is there, the working rooms are there, the materials for examination are there; and you could send any number of pupils to be instructed there, and they would receive their education free of all charges—for those are the terms on which I receive the students who come there.

Now, I think it is worth while for the State Board of Agriculture to consider whether it will not encourage the founding there of special professorships for those departments which are needed to be taught in our agricultural colleges, and thus build a nursery which shall prepare all the teachers we want, which we have not got, and cannot get, and which we ought to educate at home.

This is a mere appeal to your sympathy, and I think that the institution in behalf of which I have made that appeal, deserves that sympathy; and I think that it is the only institution in the country where such a thing can be done with a chance of success, because it has all the appliances needed, but it has not an income sufficient to connect with its present operations that of teaching, in the way in which teaching should be done, for agricultural purposes. The purely scientific purposes for which it was especially founded are there carried on, and it requires only some such extension in order to give it that practical capability which would foster the progress of agriculture in the various directions in which natural history is necessarily connected with agriculture.

And let me add one word of a general character. I am fully aware that agriculture needs no science, because men have cultivated the soil before science existed. All antiquity raised domestic animals, and plants which served as food, before the raising of any of these things had been worked up into a scientific form; and therefore, any scientific institution, or any individual who claims that science is absolutely necessary to carry on these operations, would be guilty of an unwarrantable exaggeration. But then, it is equally true, that agriculture has made, under the influence of science, such progress, that in our days of rapid movement, the community cannot afford to discard scientific progress, and science will contribute to the improvement of all departments of human activity; and it is just that beneficial influence that I should like to see penetrate rapidly and more extensively all branches of practical business, and agriculture in particular; and there is nothing that would stimulate that more than the special study of natural history, in connection with agriculture.

Now, when I allude to that, I allude to a very comprehensive field, for the natural history of agriculture embraces the knowledge of all the larger domesticated animals—their anatomy, their physiology, the nature of their diseases—in fact, the natural history of agriculture embraces that which forms the foundation of the veterinary surgeon's science. Then it embraces all that relates to those other animals, of less value, and yet of considerable interest upon the farm—all the various kinds of fowl, the economy of bees, and the characteristics and habits of insects injurious to vegetation.

There is an erroneous impression abroad that science must know insects, that science can therefore furnish all the information needed to insure the destruction of insects injurious to vegetation; that books may be consulted, and that from books you may get all the information necessary to obviate the injuries done by insects. Well, if in Germany they have done great things in the study of their insects injurious to vegetation, if in France they have done something in that direction, what have they learned? To know the animals and insects that are injurious to vegetation in those countries. But we have others here, and we cannot do anything towards checking the injury they produce until we know their habits. It is a new study to be begun. When I get a letter from a man in the West, or at the South, telling me that he has a worm or an insect on his farm which does great harm, and he wants to know what to do, it is as if a man in China should write that there are birds about there which he would like to catch, and ask with what bait he may catch them! We should want to know first what the bird was, before we could tell what bait should be used to catch him. And so it is with our insects injurious to vegetation. The different sections of the United States produce insects injurious to vegetation which are different from one another. The insects injurious to vegetation in South Carolina are totally different from those which damage our crops, and therefore must be studied there; and when they send to the North for information, we can simply say this—" We know nothing about it; you must study that subject at home; and unless you have studied it at home, you can have no remedy."

Now, how will science help in this matter? Just by giving the methods by which the study can be made; by just telling how insects are studied, in a general way; and with that general information, the agriculturist of any district which has not yet been investigated in that manner may go to work and learn for himself, or through those to whom he may intrust the labor, what to do for his particular locality. That is exactly what I should like to have done in the way of preparing teachers for our agricultural colleges. Give them that kind of general knowledge relating to those animals which belong to the different classes from which are borrowed the useful animals, and any which exist that are injurious to vegetation, that with this general information, they may begin to carry on the special study which will give them the means of checking the injurious one, and of fostering that which is useful.

H. C. MERIAM, of Tewksbury. It is perilous, almost, to attempt to say anything on the subject of cattle husbandry, after it has been nearly exhausted by others; but its importance has not been exaggerated. I believe the value of neat cattle in this Commonwealth to-day cannot be much less than twenty millions of money; and I think there is no man who is in the habit of visiting Brighton market, or knowing the prices at which cattle sell there, who will not say that grade cattle bring from twenty to thirty per cent. more in open market than scrub or native cattle. I believe myself, that with a little care, our neat cattle might be increased twenty-five per cent., at least, in value. Agriculture in New England is somewhat general, and hardly any farm in the interior is devoted to making butter and cheese. Generally, where there are forty head of cattle, there are some fifteen cows; the farmer is raising calves, has a few heifers and steers coming on, and some three or four year old steers with which he does his work, while the older ones are sent off; so that I think the breed should be selected which is adapted not only to the dairy, but to beef and working oxen.

It has been stated here that the first male put to a young female has an effect forever upon her offspring. That doctrine has increased in favor somewhat within the last twenty years. I recollect conversing with the late Col. Jacques, who was perhaps the most experienced breeder in this country, and he told me that he thought there was nothing in it. I have been engaged in breeding the greater part of my life, either for myself or others, and I will state my experience, which satisfies me there is nothing in the doctrine whatever.

As long ago as 1840, I bought a scrub bull to mate a Durham bull. I worked my Durham bull to give him exercise, in order that he might be a good stock-getter. By accident this scrub bull got to a young Durham heifer, white, and she had a mongrel calf resembling the father. After that I mated her with a pure Durham, and I never saw a single trace of that first impregnation in her offspring. About that time I had an African gander, which differs as widely from the Bremen as the African from the Caucasian. The African gander has a broad head, bill black, with a crown on the top, a long neck, and is of rather a slate color. The Bremen is a short, thick, milk-white goose. I mated this African gander with a white Bremen goose, and her first brood resembled this African gander. Subsequently I mated her with a pure Bremen gander for years, and I never saw a trace of the African blood in feature, color or anything.

Again. Somewhere about that time a friend of mine had what was denominated a cross-breed hog—a very thrifty, large hog, but the color was black. I at that time had a young Mackey sow, pure white. Wishing to enlarge the size of the Mackey, I put this pure black cross-breed boar to this pure Mackey sow, and ever afterwards bred her to a pure Mackey, and I never saw a trace—not a single trace—of the first impregnation. And in breeding fowl, pigeons, dogs, geese, rabbits, sheep, horses and cattle for thirty years, I have never seen a single fact to convince me of the truth of the proposition that the first impregnation influences the future offspring.

With regard to the feeding of animals, I think, with the chairman, that there is no subject upon which individuals differ more, in the expense and in the results, than in feeding cattle. I have one neighbor who I think feeds his cattle full fifty per cent. cheaper than his other neighbors. I was astonished at the small quantity of food with which he carried his cattle through, getting the usual quantity of milk, and keeping his cattle in good condition. He adopted the practice of mixing up his

English hay, meadow hay, cornstalks, shorts or meal, whatever it was, and soaking them. Now common sense teaches us that an animal, in order to thrive, must have the same amount of nourishment to produce a given result. Then the question arose in my mind, "If he feeds so little, how is it that the cattle are in such good condition and he obtains such results in milk?" I accounted for it in this way. In the first place, by soaking the food, you get a larger bulk. Every gentleman familiar with breeding animals, and who has examined closely their excrements, knows that a vast amount passes through cattle and horses which is not digested, and is therefore lost. Then there is a loss, where the food is fed dry, in the coarse matter which cattle reject. I think soaking the food is preferable to steaming it. If you steam too much it has no resemblance to succulent green grass, the natural food of cattle; but when it is soaked thoroughly—made to absorb as much water as it will—it is put into its natural state, so that it resembles the natural food of cattle in their wild state. Our cattle are fed, six months of the year, in an artificial way. In their wild state they would migrate, as cold weather approached, to a climate where they could get their natural food—green grass or browse. I think the reason that twenty-five or thirty per cent. of hay and grain is saved by feeding them to cattle after they have been soaked, still producing the same result, is because it is brought into the condition of their natural food; it all assumes a common character and is eaten up clean.

Then there is another advantage. Men and animals fed on one thing will not thrive. If you watch animals closely, you will find that they take a great variety; and by mixing this food up, you give them a great variety. At the State Almshouse, in our town, they steam the food for their cattle, and produce the same result mentioned by Mr. Birnie. They not only feed their cattle cheaper, but they get a larger quantity of milk from the same number of cows than is obtained on any farm in town. And not only so, but they make better butter from their cows in that way.

I was glad to hear reference made by Mr. Birnie to the speech made at one of our agricultural exhibitions last fall in relation to the Agricultural College, which has not been noticed by the press. It was a very remarkable speech, but it was a very illogical speech. It was a speech made, I think, for buncombe; but Mr. Buncombe was not there to hear. The audience did not happen to be opposed to the Agricultural College. The first position taken was, that the Agricultural College would prove a failure; and the next was, that an Agricultural College was impracticable. Well, why should an Agricultural College be more impracticable than a law school, a school of medicine, or a commercial school? But then gentlemen who read, who know anything of the history of agricultural science and literature in Europe, know that the lights of Europe, practical and scientific, have originated in those schools. It was said in this speech that if young men were educated at the Agricultural College they would not follow farming. That has not been found to be the fact in Europe. Agricultural science—practical agricultural knowledge—is in demand in Europe; and those who have graduated from the agricultural schools there have become most valuable stewards on large estates; have become lecturers and writers; in short, have become the lights of European agriculture. To be sure, some young men who study law or medicine abandon the profession; but generally, a man who adopts a profession devotes himself to it, no matter how disagreeable it may be in some respects. See what Professor Agassiz does for the cause of science. You could not find one Irishman in a hundred who would go through what he does to obtain accurate information. Will men who undertake to learn the science of agriculture be any more likely to abandon their purpose than the lawyer or doctor?

Again, he said, teachers could not be obtained. Pray tell us how teachers are obtained in law and medicine? Do they spring up out of the ground? Are they spontaneous, like the trees, or have they been educated? Then he said further, (showing himself very illogical,) the mass of the people could not be made scientific. Well, I ask, applying the same means to the same ends, is it not as easy to make one hundred men scientific as one man? But he says, the utmost that can be done is to have some scientific lecturers go round among the people and teach the elementary principles that the people may adopt. Now, pray tell us where these lecturers and scientific teachers are to come from, who are to go round among the community and give that instruction which the ex-governor thought was so necessary? Are they coming from the law schools, the schools of medicine, or the commercial schools? Are they coming from Harvard College? Is there a professorship of agriculture there? Pray tell us where they are to come from. They have got to be made, like the teachers of every other science. We have got the machinery to manufacture them, and all we want is to put it at work. We cannot, of course, start off in an agricultural course as Harvard College does in its literary course, but we can make a beginning. The only conclusion to which I can come, is that we can never have these desirable teachers and scientific lecturers unless we have some special school for their instruction; and I do not know of any special school better adapted to furnish the community with that very necessary class of men which the ex-governor considers indispensable, than the very college which he says is a failure and must be abandoned. I would like to have the ex-governor explain how he would get these teachers, unless we have some college to make them.

Again, he said that the graduates of the Agricultural College would not find remunerative employment. I ask, what literary labor, what scientific labor, is in greater demand, and what men enjoy wider fame or are more extensively read, than men deeply versed both in the science and practice of agriculture? I know no literary labor, no scientific attainments, that can command better prices than attainments in agricultural science and practical agriculture. I was surprised that a gentleman who had been so highly honored in Massachusetts should make a speech so well becoming the dark ages.

Professor AGASSIZ. Mr. Meriam made one remark to which I should like to reply. I believe that a negative result never destroys a positive experiment. The influence of a first copulation has been tested in so many cases, that the absence of such influence, even in a great many cases, would not show that it does not occur. Of course, when it is affirmed (and I will presently give the facts on which the assertion rests,) that the first copulation has an influence upon the character of the following generation, it is not maintained that fecundation is done forever in that first connection of the sexes, or that whatever copulations may take place afterwards are to be always influenced by that, but it has been ascertained in so many instances, with reference to so many animals, in such different countries, and in such different ages, that the effect of a first copulation is felt, not only in the product resulting from that connection, but in the products which result from subsequent copulations, that the fact cannot be denied. If we take it historically it is a thing which was known to the ancients; it is a thing which was known to the Jews, and so well known, that in their law it was incorporated in this form—that if a woman lost her husband, she was bound to marry her husband's brother, and the children resulting from that second marriage were to be the first man's children; and the laws of inheritance of Palestine were based on the fact, that there was such an unmistakable impress made upon the woman by the first connection she ever had, that it was not much out of the way to consider that her children, even by a second husband, belonged in a certain way to that first dead husband, who had nothing to do, apparently, with the procreation of the later children. But let us let Jewish law alone, and come to animals; and I will mention some facts of which I have special cognizance. A mare was covered the first time by a zebra—an animal of a character never to be mistaken—it is a horse with transverse stripes over the body and a black bar along the middle line of the back. The offspring of that connection was a mule, a half-breed between a zebra and a mare. After that, that mare had colts from a horse, and they were striped. Whence came those stripes? Certainly not from the second copulation, for after the birth of the first offspring, that mare never saw another zebra; but when she was put to a horse, and had a second colt, that colt was striped. I have seen, in Mobile, the offspring of a mare, which had been put to a donkey, and which had bred a mule first; and afterwards she was put to a horse and had a colt, which had a black bar along the back. That was certainly a mark of the donkey. We have no horse which has never had that influence with that distinct longitudinal bar along the back and cross-bar over the shoulder. That colt, born from a mare by a horse, which mare had had a donkey before, I have seen myself. So here we have an instance where the effect of a first connection is unmistakable. I have seen examples of the same kind in dogs, within my own personal experience. A bitch of one breed, connected with a dog of another breed, having in the first litter pups which resembled some of them the mother and some the father, in a second litter, by a dog of another breed, had pups not only like the mother, and like the second father, but like the first father too. Here, then, you see again the unquestionable influence. I do not say that I do not know of a large number of cases where the influence of the first male is not perceived in the subsequent offspring, and it may often not be perceived at all, because of the great resemblance of the second father to the first; but whether or not the cases are more numerous than I am aware of where no effect at all is felt, it cannot be denied that there are cases where the effect is unmistakable; and supposing that only ten per cent. of animals receive by their first connection an influence which is felt in the following offspring, would it not be well to save a valuable animal from the possibility of being subjected to a bad influence, to be carried through life, by securing for the first male an animal which should, at all events, not contaminate the female, and bring in the possibility of bad offspring, in consequence of that unquestionable influence which the first male has, possibly, not necessarily, on future production?

Mr. Meriam. The dog is the most uncertain of all animals to experiment with. I could state probably twenty experiments in my own experience as a breeder, covering over forty years, as closely observing as I am capable of, where no such influence was perceived. But speaking of mules, one evening I was present where this subject was discussed, and one gentleman, from Kentucky, distinguished for his scientific attainments, and a close observer, said he did not believe anything in it. "In our neighborhood," said he, "we put our young mares to jacks. When they get more mature, we then breed them to our thoroughbred horses, and out of a large number of horses bred from mares which for their first foal had had a mule, I have never seen a trace, in the hair, the form of head, or anything, of the donkey." Now, no amount of general reasoning, no amount of theorizing, would shake the result of my experiments a particle. I do not believe there is anything in it. The doctrine is, that impregnated once is impregnated forever; that the influence of the first impregnation extends down through future offspring. I have tried that on fowls of different kinds, and various animals, and my occupation for forty years has been that of a breeder, and I have not seen a trace of it. I am confident that there is no person in this county capable of speaking more confidently or truthfully than Colonel Jacques, and he thought there was nothing in it.

Professor AGASSIZ. Facts are facts, and they are very stubborn things. If I mention facts which I know, and you have facts which are different, your negative facts will not annihilate my positive facts. Mine are positive results. I mentioned experiments with dogs. I have taken care that these animals did not wander. I am not so careless, when I am making an experiment, as to allow the animal that is experimented upon to wander about and have connection with animals unseen. It is kept in confinement. Now, when in such a case I obtain in the second litter pups which have marks of the first father, that is a fact; it is no theory. That bitch has not given birth to pups like her first male in order to please me, but just because she had been influenced that way, and she had to bring what her belly contained. Those were the things I saw, and I cannot say any more about it.

JAMES THOMPSON, of Nantucket. A fact has just come to my mind which illustrates what the chairman has said in reference to the breeding of animals. Three or four years ago there was a ship cast away on our island, on board of which there was a very fine bitch—a large, beautiful animal, and a perfect water dog. A gentleman on the island had a large black Newfoundland dog that was always playing in the water. They were coupled together carefully, and the bitch kept clear from every other dog for months afterwards, so that it should be a sure thing. The result was a litter of five pups, only one of which was worth the hair that was on them for water. You could not drive them into the water; you could not teach them to go into the water. These animals belonged to two distinct families, apparently, and were brought together under such circumstances as confirm the statement that it is best to continue breeding in the family as much as possible.

I want to say a few words in regard to the breeding of cattle and the stocking of farms. I do not wish to particularize any breed of cattle, and I would not, only it seems to me that it is not fair for us to go away with not a word said in favor of other breeds than the two alluded to. I am in favor of all breeds of cattle upon the farm, just as the chairman has said. I do not believe that the growing of beef, in the State of Massachusetts especially, is of any advantage to the farmer generally. The subject was brought into the Board of Agriculture a few years ago, and a committee appointed, who investigated the matter for a whole year; and the result of their investigation was, that it cost about $29 to bring a heifer to three years old, and she would sell for $29.50. They proved by facts obtained throughout the Commonwealth that a steer, at three years old, cost about $48, on the average, and would bring about $49. Now, if these are facts, in reference to the production of beef in this Commonwealth, what is the use of our always bearing testimony to the value of a breed of animals that is good for beef purposes, when we want them for dairy purposes? As the chairman has said, we want one kind of animals for one branch of the dairy business, and another kind for another branch; one set of animals for one locality, and another for another locality. Every farmer should try to ascertain what his farm is adapted to produce. If a manufacturer were going to produce carpets or woollen goods, he certainly would not put in cotton machinery.

The first thing I attempted to do, to fit my farm to make a profitable income upon it, was to ascertain what kind of stock would produce what I wanted to produce to the best advantage, —that was butter, the whole year round. Then I wanted to produce the crops that would feed those animals and produce the greatest results in the line of manufacture which I wanted to get from them; these were hay and roots. I first experimented with one cow that I had always had. Then I tried a Jersey cow, three years old, and I had 336 pounds of butter in one year. Last year, I had from three Jersey cows 906 pounds 3 ounces of butter. This year, my man at the farm, or his wife, has produced 14 pounds of butter a week, and even up to 16 pounds, from one cow. Twenty-one pounds were put up from two cows in one week, in the month of November, and they furnished milk for three families and butter for two families besides; so that it was really raising 28 pounds of butter in a week from two cows, in the month of November. Those cows stand in my barn to-day. I do not find that they eat more than common cows. I feed them upon roots and hay, and let them do their own grinding. Why does a physician tell his patient that he must not bolt his food—that he must not have his food in such a condition that it will go into his stomach too readily? He wants him to masticate it, in order that the salivary glands may operate, and the saliva fit that food to go to the stomach and be digested. I want to know why a calf, when you are raising him upon skimmed milk, needs a rope hanging over his pen to suck, or he will suck the ears of the other calves, or anything else? Because it is natural for him to produce the saliva from his mouth, when he is nursing his mother, to go into his stomach and assist in digesting the food. I have looked into this matter with my young heifers. I feed them in the morning with ears of corn, three and a half or four quarts apiece, and it produces a great deal of saliva in the mouth. They do not have over ten pounds of hay a day, and they keep well, look well, are fat and hearty, and I have never known one of them to have a sick day. At noon, I give them a couple of quarts of corn apiece, and two quarts of carrots. A horse, weighing 1,160 pounds, has two quarts of shorts at night, from six to eight pounds of long hay, with this fine feed upon it; in the morning, he has perhaps four pounds of hay, with the corn on the ear. That is all the feed that my horses have to work upon.

I endeavor to encourage a disposition in my cows that are in milk to eat all the time. I want to give them food that they cannot fill themselves with readily. In the morning, they have fresh hay, or else go to grass. To be sure, everything that I can bring nearest to grass for a milch cow will produce the most milk. I do not believe in giving them food which will not distend the stomach. When I have cut the food, I have found that the stomach of the cow was not so well distended as when I have fed it uncut. I want to have the abdomen distended as much as possible, and have the cow eat as much food as she can get into it.

As to breeds of cattle, I have nothing to say for one or another, further than the results I have stated. It is for every man to select the breed best adapted to the capacity and wants of his farm, and which will give him the greatest results.

Mr. Flint. The chairman referred to one thing which I think should receive a little more attention than it has. I allude to what he said respecting cotton-seed meal. It seems to me, from what I know of it, and from what I know of the opinions of practical farmers in regard to it, that his experience does not correspond with the general results obtained in feeding cotton-seed meal; and it may arise from the fact that his experiments were made soon after the preparation of cotton-seed meal was begun, and not within the last few years. It seems to me that the article which he used must have been different from that which is used now. It is known to most farmers, perhaps, that when it was first brought into the market, it was unhulled, undecorticated, and there were some positively injurious results which followed from feeding that article. Within the last few years, however, it has been decorticated, the hull has been taken off, and it has gone into the market. Now, Dr. Loring's experiments were made several years ago, if I am not mistaken, and I am inclined to think that the article was different from that which is in the market at the present day. At any rate, it is the only instance that has come to my knowledge where the result has not been satisfactory in a very high degree. It is not a week since I heard a practical farmer, speaking of its effect on dairy cows, say that the increase of milk was very perceptible, to the extent of two or three quarts, within a very few days. I allude to this point now, in order to ascertain if any other farmer has found any objectionable results to arise from its use.

An acquaintance of mine wanted to reduce a very rough, bushy pasture, too rocky to plough, and the question was, how to do it. Pasturing cows upon it, which had been done for many years, did not effect his object, and I advised him to stock it very heavily with sheep—twice as heavily, perhaps, as the pasture would naturally and easily carry—and then to feed the sheep with a very small amount of cotton-seed meal once or twice a day. He acted upon my advice, and put something like sixty-five sheep upon a seventeen acre pasture—not more than six or eight acres of which were open pasture, the rest being bushes. I have watched that experiment very carefully. It was made, in fact, under my own eye. He has fed some four or five tons of cotton-seed meal to these sheep and to another flock of fatting wethers, where I have had an opportunity to see the result, and so far as I can judge from my own observation it has been entirely and thoroughly satisfactory. The sheep have been kept in good store condition—it was not his object to fat them, and he fed them only a small amount of the meal, considering the number of animals and the character of the pasture. The sheep have browsed down the brush, so that in the course of two or three years, I am quite sure that very rough pasture will be reduced into a perfectly satisfactory condition, for a rocky pasture, and with greater economy than it could be done in any other way. He paid $45 a ton for the cotton-seed meal, and fed them cheaper than he could with any other substance that I know of—any other substance, I mean, bought outside of the farm. He took a great deal of pains to inquire the cost of refuse beans, damaged Indian corn, etc., and found that cotton-seed meal, at $45 a ton, with the results it produced, was a more economical food than any other substance. I have known a great many instances where dairy farmers, feeding for the production of milk, have used cotton-seed meal with very great advantage and with very great satisfaction.

And this result corresponds not only with practical experience, but with the investigations and deductions of science. Cotton-seed meal is classed by feeders with linseed meal, though chemists and scientific dairymen claim for it a superiority. When fed to milch cows it increases the quantity and improves the quality of the milk. It is a rapid flesh-former, and the manure of the yard where it is fed is of a superior quality.

Prof. Voelcker, the distinguished chemist of the Royal Agricultural Society, having given it a thorough and careful scientific analysis and investigation, arrives at the following conclusions:

1st. The proportion of oil in all the specimens is higher than in the best linseed-cake, in which it is rarely more than 12 per cent., and 10 per cent. may be taken as the average. As a supplier of food, cotton-cake is therefore superior to linseed-cake.

2d. The amount of oil in the several specimens differs to the extent of 5½ per cent.—say from 13.50 to 19.19.

3d. Decorticated cake contains a very high and much larger percentage of flesh-forming matters than linseed-cake, and it is therefore proper to give to young stock and milch cows. The dung also is very valuable.

4th. In comparison with linseed, there is less mucilage and other respiratory matter in cotton-cake. This is compensated by the larger amount of oil.

5th. The proportion of indigestible woody fibre in decorticated cotton-cake is very small, and not larger than in the best linseed-cake.

6th. And lastly, it may be observed that the ash of cotton-cake is rich in bony materials, and amounts to about the same quantity as is contained in other oily cakes.

Now, after all the scientific investigation which has been bestowed upon it, resulting in all cases so strongly in its favor, and after the approval of so many practical men who have used it satisfactorily and with economy for years in feeding it to all classes of stock, it seems to me we have a right to infer that its failure to produce satisfactory results in particular cases may be ascribed to over-feeding—to feeding in too large quantities. We know very well that any rich food, like Indian meal, for instance, when injudiciously fed, will prove too stimulating and injure the animal. But this is not the fault of the article, but the necessary consequence of want of judgment and care.

EVENING SESSION.

The Board met at 7 o'clock. The chair was occupied by Hon. E. W. BULL, who stated that President CLARK, of the Agricultural College, who had been announced as the speaker for the evening, had been detained by his duties at the College, and that his place would be supplied by Hon. LEVI STOCKBRIDGE.

ADDRESS OF MR. STOCKBRIDGE.

Gentlemen of the Board,—I desire to ask your attention to the few remarks which I may make as a plea for the agriculture of Massachusetts, and for the agricultural education of the farmers of Massachusetts and the Massachusetts Agricultural College. You are by law the overseers of that institution. Being connected with it temporarily, as one of its officers, I have been upon the ground ever since the first blow was struck the present year towards putting up the buildings and getting the institution in order for the reception of students; and I have been, to say the least, a very attentive observer of all that has taken place there. I can, therefore, speak of the facts as many others, who are equally interested but who were not upon the ground, cannot speak.

In the first place, I find there is a great deal of ignorance in relation to the institution. Why, a man who has a son in the institution told me in this room, to-night, that he had hardly any idea that there was such an institution in the State, or that there was to be one, before his son started to go to Amherst. It is so, generally, throughout the Commonwealth. The people have had no idea that we were really to have an Agricultural College, notwithstanding the talk there has been about it, and notwithstanding the money that has been appropriated for it. They have had the idea that there would be no college; that it was all talk, and nothing else. Now, gentlemen, I can say that there *is* an Agricultural College in Massachusetts. In the first place, it is located, as you know, in the town of Amherst. We have there, in my judgment, a beautiful farm for the institution, of 400 acres, finely located in the valley of the Connecticut, with a great variety of soil. We have alluvial soil, with clay underlying it; we have soil of a lighter cast, with quartz underlying it; we have soil entirely free from stone, and soil like some of your Middlesex County farms which we have passed through to-day, covered with stone, and hard and difficult of cultivation. The land is rolling, interspersed with brooks and streams; bounded on one side by quite a river, and there are numerous springs upon the land, giving us great water privileges. These will necessitate a large amount of under-draining. The soil is fertile—there is no mistake about that. It is well adapted to the growth of corn and rye. Wheat and tobacco, (which is contraband so far as the farm is concerned,) grow on that soil finely. The farm, although not very productive, is yet a farm which, on the whole, has never been run out or abused by over-cropping. Very few of those acres have been overcropped, and are what we call exhausted land. The trouble is, it has been neglected. It is covered with brush. Last spring there was a hedge about twelve feet wide all along the fenced part of the farm, giving it a very offensive aspect, which disappeared as if by magic, the present year. I say, therefore, we have got a farm, we have got a college, and we have the encouraging feeling that we may possibly succeed.

Another thing—which I should have said first—we are located in a spot entirely accessible to all God's creation. It has been said that you could not get to Amherst; or, if you managed to get there, you could not get away. Now, we are within three-quarters of a mile of a railroad depot, at which six trains a day stop, so that we have abundant opportunity to go there and to get away. There is no trouble in getting to Amherst or in getting away.

I located myself upon the farm the first of April. At that time, we had no buildings; the first blow, in fact, had not been struck. We have erected the past season, in the first place, a large dormitory building, four stories high, 100 × 50. The lower story is divided into recitation-room, reading-room, and cabinet; the three upper stories are rooms for the students, of which we have twenty-four, designed for two students each; giving each two students a sitting-room or parlor, 15 × 16; each of them a fine bed-room; each of them a fine clothes-press or wardrobe. These are the accommodations we give our students. We have erected a laboratory, so-called, in which is to be placed the chemical apparatus of the professor of chemistry, and which is to be the working chemical-room. In the upper story, we have a dining-hall, 50 × 16, where it is proposed by the trustees of the institution, that all the boys shall take their meals, if they desire it. We have erected a convenient botanical building, with a recitation-room for the class in botany, on the lower floor, and a specimen-room for the reception of all sorts of specimens in the hall above it. We have erected a large conservatory, 100 × 70, with propagating pits, and all the conveniences of the best modern houses.

These are the buildings which have been erected during the past year. You will see from what I have stated with reference to our dormitory building, that the trustees have laid a plan for a college of forty-eight students, and yet to-day, the college building is full. Our term commenced the 2d of October, and we have a Freshman class of forty-six, with the prospect of double the number for the next class. One of the rooms is occupied by a professor, so that we are now full.

The question is often asked, "What are the terms of admission?" The candidate for admission is examined in the common English branches, reading, writing, spelling, geography, and arithmetic, and we mean that the examination shall be thorough and exhaustive; that the students shall be thorough in those branches before they come there. We do not examine them in Latin or Greek, for those languages are not taught at the institution. We teach geometry, chemistry, physiology, and practical agriculture; and some of our students, this term, have taken German.

The next question you will ask me is, "What have the boys been doing in agriculture? What have the boys been taught?" Before the school commenced, the plan was adopted that every young man who came there should be taught to work upon the land. Some, perhaps, knew how to work, some did not; some had no sort of acquaintance with agricultural operations. The plan was adopted, I say, that every young man who came there should work upon the land six hours in a week; that the whole class should work, upon the land, as a part of their regular school education, two hours on Monday, two on Wednesday, and two on Friday. And then we held out the inducement, that if there were any young men in the Commonwealth who desired a first-rate intellectual education and thorough discipline (for that the trustees designed to give,) they would give them wages for just such an amount of labor as they could perform, without detriment to their studies. The consequence has been, that we have some twenty students who have been at work during the entire term for wages, from one up to four hours a day, besides their two hours work with the class every other day in the week.

Then the question comes, "How do you make labor and study go together?" I suppose that question will be asked me, for it often is. If I should answer it in the off-hand way I sometimes do, I should say, "first-rate." I am ready to acknowledge, that before our students appeared there, I had many misgivings in relation to the question of labor. I knew the responsibility would fall upon me, and I dreaded to have the day come when I should have from thirty to fifty young men there, and be required every other day to take them upon the land, and make a business of teaching them to work—in the first place, planning the work; and, in the second place, seeing that they did the work like men, systematically and regularly. But there has been no trouble about it; it has come as a matter of course, without any difficulty whatever. Having established the system, it has worked like a charm.

Of course, in these hours of labor, we are on discipline. It is regular business, as much as the inside work of the institution. At the appointed hour the roll is called, and every student is required to be there unless he has a good excuse, from sickness or some other cause. And I do not find them playing baby; I do not find them talking off; I do not find them trying to shirk the duty. One reason, I suppose, is this, that the best scholars in the school, those who regularly mark highest in their studies, are the very best men we have in our labor companies. They take hold, and then all the rest, as it were by their influence, follow.

"What have you set them about?" Well, they came at a very unpropitious time of the year. They came in the fall. I can imagine that I could interest them if they came in April, when we were planting our gardens, and when everything was starting with the new life of spring; but when they came in the fall, when our work was the hardest and least interesting, I did not know what might be the result. Now, I have put those boys upon the hardest work—upon everything that has to be done upon a farm. I have made no selection, taking that which would be the nicest or the easiest, but they have been called upon to do in these hours of labor, whatever there was to be done. They have husked all our corn, some 1,800 bushels; dug all our potatoes and all our root-crops; spread all our manure; and everything these boys did with the utmost cheerfulness and alacrity. They took hold and worked like men.

When the crops were harvested, what next? We had upon the farm some old orchards, whose day had gone by. The trees had become worthless, and the boys were set to work digging round them, digging up the roots, and taking the tree down, stem, root and branch. They have made a clean sweep of something like five acres, cutting up every tree in good shape. Then, as I have said, our land was covered with bushes, our pastures were overrun with brush. A large number of bush-cutters were purchased, and the boys were turned out and took out the bushes by the roots. They went into it with alacrity, and apparent pleasure, and something like nine acres have been cleared of every bush by the boys.

I can report, then, in relation to this matter of labor, that the system works well; there has been no difficulty whatever. Of course we have boys of different characters and different capacities. Some are lively, some are smart, and some are the other way; but as a whole—as a class—they have far exceeded our anticipations. No fault can be found with them. The thing is a perfect success. But "one swallow does not make a summer," and one term cannot finally settle the question. I say that, for to-day it is settled. I find, on comparing the marks of the professor of agriculture with the marks of the professors in other branches, that the two correspond identically; that the boy who has a clean record with the professor of agriculture marks highest in every other department; it is invariable.

Another question you will ask, is, "What have you taught the boys in relation to agriculture?" So far as my teaching is concerned, I have taught them what the Board of Agriculture have taught me. That I call pretty good teaching. Of course we had no text-books on agriculture there. In the next place, we had no system of agriculture there. I am sorry to say that here in Massachusetts to-day, although the Board of Agriculture has been at work for fifteen years, we have no system of agriculture—nothing that a man can teach a class of students and say, "This is the established, approved system of agriculture for Massachusetts." We have no such thing. Commencing with the soil, our course of instruction has been to give its origin; the manner in which it was prepared for the purposes of cropping; the material in the soil by which plant-food is formed; then the influences in the soil which go to make that raw material up into food for plants; then the manner in which the plants themselves take up and appropriate that food to their own uses, and form their bodies and their roots from it; next the effect of cropping upon the soil itself—what the process is, what the effect upon the soil is, and what the condition of the soil is after a course of cropping, running down to exhaustion; next the methods by which the fertility of the soil can be increased; or how, without manuring, the soil can be restored from barrenness to fertility; next ploughing in green crops as one method, under-draining, irrigation, the use of muck, ploughing and stirring the soil, as sources of fertility; then animal manures, their character, their composition, how they act in the soil, chemically, mechanically, &c. That has been the course of instruction in the institution, and that is as far as we have got; and if I have learned anything, I think the young men have learned something in return, of agriculture, both theoretically and practically.

I must say to you, gentlemen, familiar as you are with my views in relation to an agricultural school in Massachusetts, that from my knowledge of the people of this State, I feel assured that the Massachusetts Agricultural College will be a perfect success. Yet I have no very great amount of confidence in the men who now have that institution in charge; but my confidence is based on the knowledge I have that there is a feeling abroad throughout the Commonwealth that such an institution is needed. The constant inquiry which is being made, and which is spreading and growing more and more, day by day, convinces me that the people of the Commonwealth have been educated by the Board of Agriculture up to the point that they feel the need of an institution to educate the young men of the Commonwealth for agricultural pursuits. And here is my faith—not in the men who are there to-day, for they may make a failure of it; but in the people of the Commonwealth, and the felt need of the people of the Commonwealth for an institution of the kind. The men who are there to-day may fail of success, but Massachusetts will find men who will make a success of it; for those men feel that whenever the old Commonwealth wants men she will find them. True, we have no books to-day such as that institution should have to instruct us in agriculture, but I have faith that somebody in Massachusetts will yet make the very book we need. There is no question about that. We have no system of agriculture to be taught there, but I have faith in the people of the old Commonwealth, or in some of the men of the old Commonwealth, that they will make a system of agriculture that shall be taught there, and which shall be just the system we need.

Then, I say, I have faith in the permanent success of that institution. I believe that an Agricultural College will succeed in Massachusetts if it fails in every other State in the Union; for there are elements of success in our State which do not exist anywhere else. First, because our soil and climate are such that, competing with the great West, we are from necessity driven to a more intelligent course of cultivation. That is one reason why an Agricultural College will succeed in Massachusetts, if it fails everywhere else. Another reason is this: That this Board of Agriculture have been for fifteen long years or thereabouts at work to educate the people of the Commonwealth up to the point that they shall feel the need of a school of this kind. This college could not have been started twenty years ago with any prospect of success. Out of the desire of a few individuals for an Agricultural College grew the Board of Agriculture. That Board of Agriculture have been at work educating the people, and they now feel an interest in the school which will insure its perfect success.

Another thing. Through you, gentleman, as the delegates of the agricultural societies of the State, the Massachusetts Agricultural College is linked to every farmer in the Commonwealth. Your societies will look to the Agricultural College eventually. You yourselves, while occupying the position you now do, and your successors after you, will look after the Agricultural College; and there will be a reciprocal influence from the college to the farmers, and from the farmers to the college, which will be highly advantageous, I trust, to both.

I will not occupy the time any further, but if any member of the Board desires to ask any question in relation to the institution, I will answer it with pleasure, if I can.

Professor AGASSIZ. I have listened with the greatest interest to the statements concerning the condition of the Agricultural College, and I have no doubt, from what you have said, that a success has been accomplished—a success which will continue and increase, and do much to promote the welfare of the State. I deeply sympathize with your efforts and with your success. I know what it is for a teacher to meet with success. It is his life, and it is that which stimulates him to greater effort. I want, at an early stage of the progress of the college, that every obstacle should be removed from its path, and that all the connections which have not yet been made should be so made as to secure the more extensive usefulness of the college; therefore I should like to ask you a few questions.

We have now in the State an established system of common schools; we have in the State an established system of high schools; we have in the State a number of colleges; we have several normal schools which educate teachers for these various schools. Now here is a new kind of school introduced into this general system of practical education, connected with the various modes of educating the people at large. We have scientific schools, also, which have a practical bearing upon the progress of the higher branches of the mechanic arts and industry and scientific research. Now, in what relation do you expect that the Agricultural College will stand to the common school system; for, from what you say, I am convinced that you will be overrun with students, and will be obliged to enlarge your establishment in order to accommodate the applicants? The question will come up very soon, How are you to meet the applications from the large number of students who will prefer the education which you give to that of the high schools, or perhaps to that of some of the more advanced schools which do not reach the level of high schools? Have you any idea how the agricultural colleges which exist in other States are to be provided with all the professors needed in the various departments, and how do you think it will be possible to educate the teachers for all these schools? In other words, what kind of normal school for agricultural teachers do you contemplate in the future? for with the growth of your school, and with the growth of other schools throughout the United States, this will become as imperative a demand as normal schools have become a demand with reference to our common schools. From the broad and comprehensive plan you have laid before us, from the evidence you have given us that the very life of the majority of the public is interested in the enlargement of this agricultural education, I do not suppose that in your mind you conceive the present dimensions of the college to be its limit; and therefore I have hit, I believe, upon the very point—the very prospect which the future must open. A wise man ought to look ahead in order not to be cramped when the time comes.

Mr. Stockbridge. In reply your first question, "What part the Agricultural College is to play in the educational system of Massachusetts?" I will say, that from my stand point (I may be incorrect,) it will occupy the same position in relation to the general system of education in Massachusetts that Cambridge College does. It is an institution independent of the general school system, exactly as Williams or Amherst or Harvard is. Although it has been, and will be, I trust, aided by the State, it does not form a part of the normal nor common school system of the State, any more than Cambridge, Amherst or Williams, all of which have been aided by the State.

The next question is, how shall we obtain teachers for our own Agricultural College, and how shall teachers be obtained by all the other Agricultural Colleges of the nation, that are now springing into existence. That is a question that was asked eight or ten years ago. I remember, in 1858, when I, with some others, threw the Agricultural College ball into the legislature, all hands began to knock it round with their clubs, and the club that hit it hardest was, "You haven't anybody who has been educated to teach!" The answer was, "You must commence in the common schools. The common school teachers must teach agriculture." That idea was started in 1860, or somewhere about there. Now, I must say that I am just as much in the dark to-day, as then. I do not know how we are to get the men, but I have faith in the men of Massachusetts, that when a demand is made, the men will be found. It was only last week that a gentleman from Iowa came to Amherst, and said, "We are after men to start a college in Iowa, and we have come to Massachusetts for them." I said, "Wait four years. We are training men for your Iowa college. I have no doubt we shall make some good ones for you." That is all I could say to him. I know we shall make some good men, if they will only wait long enough. We have the raw material; I believe somebody will work it up.

Professor AGASSIZ. I believe there is an interest in agricultural, scientific, commercial and military education, which is now scattered, but which might be concentrated and made to work much more effectively than now. That is what I wish to reach. My question was with reference to the possibility of contriving some way by which the efforts of the friends of these various educational institutions, which are now organized in different parts of this State and throughout the country, may be combined, so that they shall help each other. In the scientific school at Cambridge, we are just as much at a loss to know what we shall do as you probably are, in reference to the future when your pupils shall be increased. Our means are entirely insufficient, and I suppose yours are entirely insufficient; and I think the time has come when we should make it known to the community how in this age—which is an age in which all education is changing, in which scholastic and monastic education is vanishing, in which even literary education is waning, to make room for more practical, for more active, for more scientific instruction—I say I think the time has come when we should make it known to the community, how they are to move in that direction. I hold that even our common school education, admirable as it is, tends too much to book learning—just as much too much as our colleges do. The cry against mere book learning in the colleges is already loud enough, but it should not reach the college only; it should reach the common schools also, because there is a great deal of study of things that might be introduced there. If the children of all the common schools could be taught to recognize and know by sight all the stones upon which they tread; if they could be taught to know by sight all the plants and animals which are found in their neighborhood, they would come better prepared to your agricultural school than they do, and they would be equally better prepared to come to our scientific school in Cambridge, or to go anywhere. The foundation would be laid of a better preparation for that practical training which our age demands. I think that agricultural colleges will have somewhat the effect to lead in that direction; and we should, I think, from all sides, press upon the community the need of learning in the direction in which the wants of the active community go, not merely in the direction in which an antiquated practice has led us thus far. I would not lessen in any way the value of scholarly culture. I would not disgrace my mother—and letters have been my mother; I would not disgrace culture in ancient lore even, impractical as it is; but I think in the methods by which these things are taught, there are savings to be made in time which could be applied to things far more useful. When our boys give so many hours to the study of Greek and Latin grammar, I think that that is practically useless, because they could learn a great deal more Greek and Latin, in a way which would last better, even with less of that kind of teaching; and a little more natural history, and a little more of foreign modern languages, would certainly be a very useful substitute. I think that there lies the need of co-operation between all these institutions which have sprung up to meet wants in a direction which schools and colleges, as they have been thus far, have not supplied. I look upon the Agricultural College as an auxiliary now to the scientific schools of our colleges; and I hope these scientific schools will be friends of all these efforts in the direction of the Agricultural College.

Mr. STOCKBRIDGE. In relation to making the knowledge of science practical, I think the faculty and trustees of the Agricultural College entertain views which are entirely in harmony with yours. While they would desire to cultivate high science there—while they desire to secure men as teachers who are known as men of high science—they desire also to secure men who have the talent to make that science entirely practical; to apply it to the common pursuits of life, especially agriculture. I believe their views in this respect are in harmony with yours.

In relation to the matter of fitting men for teachers of the Agricultural College, if it is your idea that there might be a school inaugurated at Cambridge, where we have the greatest advantages, where almost everything that relates to human science is gathered, which should fit men to be scientific teachers at our agricultural schools, I am not certain but that is just what the age demands, and that Cambridge itself might be the place to educate the men whom we have failed to see coming.

CHARLES G. DAVIS, of Plymouth. I do not know whether it is the intention of the Board that there shall be a discussion upon this subject on which we have been addressed to-night, but it seems to me we cannot better employ our time while we are here than by dealing with some of the questions which have been suggested by the learned gentleman who has just taken his seat, with regard to the Agricultural College—its wants and our wants.

It seems to me that the most satisfactory answer to the question which the gentleman asks with regard to the future, and with regard to the means by which teachers should be hereafter supplied, is almost one of faith. I cannot say that I believe exactly in destiny, but I believe in development; and I think the time has come when we who are assembled here, at least, are grounded in the belief, are grounded in the faith, that teaching is hereafter to be more practically applied, and at the same time more useful than it has been heretofore, in more scholastic times. I think, with the example of the gentleman himself before us, who has educated himself, who has been to no normal school, but the school of nature herself, and who has fitted himself to become the teacher of all mankind, we may rest assured in the faith that the American mind, if not taught by normal schools, will train itself into teaching. No better example occurs to my mind than that of the gentleman who has just sat down. I certainly can say for one—and I think my fellow-members upon the Board of Agriculture at that time will join me in saying—that with the knowledge we had of that fine Yankee common sense, that keen intelligence and that practical experience which the gentleman possessed, we did not expect, after all, when we selected him, that we should find him so well fitted for the practical task which he has taken upon himself, and which, so far, he has proved himself so well qualified to perform. When, too, Prof. Chadbourne was selected as president of the college—a man very little known to the mass of the people of the Commonwealth—it seemed to us, for a time, as if he was developing himself, almost as by the providence of God, for the purpose for which he was appointed. I think we can rest assured, therefore, if there is teaching to be done, that teachers will come; just as we can say that there was teaching before normal schools existed.

In saying this, I do not mean to intimate for a moment that we have no need of training for teachers; because I think the great danger in any college is, that the teachers will become scholars merely, and will not have the ability to apply their teaching in their own personal experience. The men who sustain the idea of this college are men who do not feel as we do who have thought more upon the subject, so much the necessity of more accurate scientific knowledge, as they did the desire that there should be a place where farmers' boys could be taught farming in a more general sense. I agree that that is the great want of the farmers of the Commonwealth; but in saying that, I do not mean to suggest that this is all that is needed; but I mean to suggest that this is what we felt, who were more nearly connected, as we supposed, with the wants of farmers and farmers' sons, to be the want in their minds; and it was for that reason that it was thought, more especially by the gentlemen connected with the Board of Agriculture, and more intimately associated with the agricultural societies of the Commonwealth, that that want would be supplied, although it was very necessary that an equally great want, and a much higher one, that of a school of all the arts, should be met. It seems to me, therefore, that we have to thank Congress for putting those words, "practical manual labor," into the law. I think the sheet-anchor of this college, as applied to the wants of the farmer, rests in the practical application of science upon the spot, in so far as it can be done.

I was very glad to hear a gentleman associated so intimately with Harvard College as Prof. Agassiz, avow the sentiments which he expressed with regard to the importance of more practical teaching everywhere. I remember, sir, when I was at Cambridge (having had the honor of graduating at that institution,) that when I studied astronomy, I could not ask where a star was—it was against the law; it was *mathematics* that I was learning; it was my mind that was being trained. I could not ask to apply geometry or arithmetic to any part in surveying or architecture; it was mathematics I was studying; and my mind was cramped at the time—(not that my mind was any more exploring or any more inquisitive than others)—and I felt that the mind of the young man at Cambridge, in that course of mathematics—and to some extent it was true of all the other studies—was made to germinate, it began to burst, and then, in the very act of germination, it seemed as if it were cramped.

Now, I think that the people of the Commonwealth—not the scholiasts, not the mere scholars, of the Commonwealth, but the people of the Commonwealth, agree fully with the spirit and substance of the remarks of Dr. Bigelow in that most remarkable common-sense lecture which he gave some two years ago, I believe, in Boston. I think, if what are called literary colleges do not change their methods in some respects, there will be such a growth of institutions like the Agricultural College, that they will have to look out for themselves. I do not know, for one, that it was wise, so far as Amherst College was concerned, to encourage the location of an institution like this so near to her own borders, because I doubt very much whether the child may not be likelier than the mother in some early future day. But I think these scientific schools, the school of Technology in Boston, and the various groupings of men particularly interested in agriculture during the last fifteen years in the Commonwealth, are indications of this popular feeling, that Greek and Latin, sometime or other, are to be accomplishments, and not the means alone of training the youthful mind; and that mathematics, that geometry, that astronomy, as they are to be taught hereafter, are to be taught by men who are endeavoring practically to draw lightning from the skies, and devote knowledge to some use, rather than to the purpose merely of training the human mind.

But it seems to me that we here have something practical to do, if we agree in the hopes and the faith which have been expressed by the gentleman who has addressed us this evening. It is well known, and must have been perceived by the remarks made by our friend, that this College is now in a position where it must be dwarfed by the Commonwealth, and on the responsibility of the Commonwealth, or it must be allowed to grow; and I understand that the trustees propose to ask the legislature this winter for an appropriation for the purpose of building a dormitory which shall be sufficient at least to hold the next class, which, as has been suggested, will be as large, and probably larger, than the one which has already entered; and I think we, as gentlemen from various parts of the Commonwealth, can do no better practical work than by seeing the representatives and senators, with many of whom we are personally acquainted, and with so many of whom we can bring ourselves into contact, and ask them to assist us in obtaining such an appropriation. The State is now in a position from which, it seems to me, it cannot withdraw itself with honor; and while there will be, and should be, a very great pressure to reduce the expenditures of the Commonwealth, in all legitimate ways, this year, and for many coming years, probably, I do not see that there can be but one course for the Commonwealth to pursue, in this emergency, with regard to the Agricultural College, and that is, to give it a chance to breathe; and I hope, sir, that we may be able to exert, legitimately, such an influence upon the legislature as the gentleman who has put the question has so often done by his own personal eloquence and power, in behalf of the museum at Cambridge; and that it may result in such a grant to the college, as shall enable the trustees to make the necessary, almost indispensable, addition.

I rose, however, more particularly to move a vote of thanks to Prof. Stockbridge for his address, and for the information that he has been kind enough to give us this evening.

The motion was carried, unanimously, and the Board adjourned, to meet on Wednesday morning, at 9 o'clock.

SECOND DAY—Morning Session.

The Board met at the hour assigned, and the consideration of the question of Cattle Husbandry was resumed, Captain **Moore**, of Concord, occupying the chair.

J. M. **Smith**, of Sunderland. I regard this question as one of the most important that can come before us. We discussed this question thoroughly at our meeting last year; our discussions have gone upon record; they have gone abroad throughout the Commonwealth; the people have read them eagerly, and they are looking to-day to learn what shall be result of our discussions here. I asked myself yesterday, What have we learned, or in what respect will our discussion be different from what it was last year? What new ideas have come to our minds; what advances have we made? What have we learned in breeding or in feeding? It is well known that the old patriarch Jacob knew how to breed so that his cattle were regularly streaked and speckled. Can it be said of us at the present day that we have brought breeding to that perfection? It is a question which is often asked by ourselves, "How shall we breed at will either of the sexes?" and I have an idea that even our own world-renowned Agassiz cannot answer that question. But it will be answered, and fully answered, I believe.

The question of feeding has properly come up here, and it is an important question. This subject is an important one, for the stock of cattle in a community or on a farm is an index of that section or that farm. The rearing of stock is an important branch of farming, and feeding is an important branch of raising and rearing stock. Any farmer can fill his barn with hay and grain, but not more than one in a hundred knows how to feed out that hay and grain to a profit; and I presume I can say that but one in five hundred knows how to feed out his crops so that he shall receive the market price for them.

I conclude, from my observation and experience, and from what I learned here yesterday, that the quality of the food affects the quality of the milk and also of the meat. It is well known that the child who nurses an intoxicated human mother, or rather inhuman mother, itself becomes intoxicated; and I have learned since I came here that one member of this Board has been complained of for violating the prohibitory law by feeding sweet apples to his cows and selling the milk! If such is the case—if the quality of the food affects the milk and the meat—we should be very careful what we feed to our cows. And we know that it is so; we know that the least change in our feed does affect the milk. I had this in my mind yesterday, when I asked Mr. Birnie the question if his object was to make butter or milk for the market. It seems to me that the feed which he gives his animals would be better for producing milk than butter. He recommended cabbages for cows. I recollect that a year ago I mentioned to the Board the fact, that having an opportunity at one time to purchase a lot of cabbages very cheap, I bought them and fed them freely to my cows, and the result was that they spoiled the butter. Butter-making is as much an object with us as milk-producing in other localities. One gentleman, a worthy member of the Board, who is a good farmer, and whose wife is one of the best of farmers' wives, and a good butter-maker, said he could not believe that cabbages or turnips would affect butter. He had occasion to call at my house afterwards, and brought me a little cake of butter, and asked me what I thought of that butter. I told him it was very good, but it smelt just as our butter did at the time I fed the cows cabbages and turnips. It was not perfectly sweet.

Now, I say that the feed which has been recommended here (we may call it trashy feed—it is light feed,) will produce the greatest quantity of milk, but it is not the feed which will produce the best and sweetest butter. Articles of food which will answer for one purpose, may not answer for another. It is not for me to say what particular stock shall be raised in any locality. It is not for the farmers of Berkshire or Franklin to say what stock shall be raised in Essex or Nantucket; and it is not for the farmers of Essex, or Barnstable, or Plymouth, to say what stock we shall breed on the Connecticut River. It is not for us to say that such and such articles are the best for dairy purposes, when one dairy may be for producing milk, and another for producing butter. My idea is this, that milk consumers are not so difficult to please as butter consumers. Our chairman of yesterday, Dr. Loring, spoke of Indian meal, and any meal, which contains oil, as bad for dairy stock, and recommended feeding with wheat and rye bran, etc. My experience tells me that these are very good ; and I dwell upon this particularly, because his object is to produce milk, while mine is to make butter. My experience teaches me, that these kinds of food will tend to produce a large quantity of milk, but will not make a great deal of butter. If the farmers of the Connecticut River wished to produce butter, white as the driven snow, they would feed broom corn-seed and corn-stalks. It would take twenty-four hours to bring the butter, but it would be white, as I say, as the driven snow. If they wished to produce butter which should be hard and yellow, they would give a mixture of Indian corn-meal. I never have seen any ill-effects from feeding Indian corn-meal, given to dairy cows in small quantities, and my experience tells me that it will make better butter ; and it is admitted by all, I suppose, that it will make more flesh.

Now, in regard to cotton-seed meal. The assertion was made quite broadly that it was injurious to cattle, kept for dairy purposes. I have fed tons of it with satisfactory results. I have fed it the past summer to my dairy cows, and I am still feeding it with satisfaction ; and I shall continue to feed it until I see that it produces ill effects.

A MEMBER. How long have you used it ?

MR. SMITH. Several years continuously. I remarked this morning, privately, that I had fed one cow—the best I have—year after year with cotton-seed meal, and she does as well as ever.

DR. LORING. How much do you give ?

MR. SMITH. Three or four quarts a day, perhaps, mixed with lighter feed. I am now feeding my dairy cows three quarts each, once a day, half cotton-seed meal and half cob meal, and once a day half a bushel of carrots each. I have one cow, which I am not intending for dairy purposes, to which I have given a very much larger quantity of cotton-seed meal. It is a cow that I intend to make beef of before the year comes round. I have fed it to all kinds of cattle—fatting sheep, fatting cattle, store cattle, breeding sheep, and ewes with lambs and without lambs—and the only ill effect that I ever saw from using cotton-seed meal was to early lambs; but early lambs, (those fitted for an early market,) are exceptions to all the rules of feeding. They are like hot-house plants. They are forced forward for the early market, and it is intended that the lamb, from the day of its birth to the day it goes to market, shall feed freely and be free to go and come. The ill effect I speak of manifested itself last spring, when I lost several lambs, and I laid it to the cotton-seed meal. The lambs appeared to have a secretion about their intestines, and appeared to be dropsical. I have noticed, in feeding sheep heavily upon cotton-seed, that it tended to produce a too great flow of urine; and I presume it was the same with those lambs—that it produced too great a secretion of water, and killed some of them.

Such has been my experience in feeding stock upon Indian meal and cotton-seed meal. I have fed it for the reason that it is the cheapest article of feed in the market. It is good for fattening purposes, it is good for dairy purposes, and it makes the best manure.

Mr. Birnie. Have you ever fed it to calves?

Mr. Smith. I have, in small quantities, and I never saw any ill effects from it.

Dr. Loring. When I referred to cotton-seed meal, I was not speaking with reference to cows or feeding for milk alone, but I was speaking of the kinds of food most conducive to the health and long life of cattle; and I said that I considered oleaginous food as injurious to cows, and I gave as a reason, that it produced inflammation of those delicate tissues which were so remarkable in the cow, and which were so easily affected by the accident of climate or weather or food, and which rendered it imperatively necessary, in order that a cow should live a long life of usefulness, and not be cut off in her prime, as Methuselah was, that she should be fed with great care.

Now I have had experience with cotton-seed meal, and so have others. I began early. I suppose I fed it as early as any feeder in the State. Many years ago, when the Providence Company first introduced decorticated meal—which must have been as long ago as 1859, and perhaps 1858—a quantity was sent to me and I used it. I found it would produce milk and fat. I was attracted by it, and the next year I began to feed it. I did not feed so largely as Mr. Smith does—not more than two quarts a day; and out of fifty cows I was obliged to get rid of thirty in two years in consequence of inflammation of the udder. I found they were losing their capacity to give milk. And of the remaining cows—many of which were pure bred Ayrshire cows, which I did not desire to sell at any rate—were injured, and it took me three years to bring them back to their former condition. That was one experiment. It was manifest that the cotton-seed meal produced that effect. Year before last I purchased in Vermont, in the fall, some cows, intending to feed them in the fall and winter and turn them in the spring. They had just calved. I gave those cows five quarts of cotton-seed meal for the purpose of keeping up a great flow of milk and getting them in good condition for the butcher. Of that lot of cows I retained two, they were so remarkably good. They gave, at the time I was feeding them, just after I purchased them, from sixteen to eighteen quarts of milk a day. I kept them through the next season, turned them out to grass; they calved again, but they never gave over six quarts of milk, and I never got them into condition again. It seemed as if they had been poisoned, or there was something the matter with their digestive organs which had been injured by the cotton-seed meal. That was another experiment.

Now Mr. Smith says cotton-seed meal is cheap in the market. What is the reason? The English feeders are purchasing what they call oil cake at double the price of cotton-seed meal—and why? Because their experience has shown them that cotton-seed meal is injurious. It is not a week since I met one of the most intelligent English feeders, a young farmer from Somersetshire, who is engaged in breeding Herefords, and whose father is engaged in fatting Devons, and he gave me an exceedingly interesting account of these two classes of animals. He said he was making meat for the market. I asked him, "Do you feed cotton-seed meal?" "No, I don't." "Why?" "Because half a dozen animals on our two farms have died from that cause. The veterinary surgeon found that it had injured them in such a way as to be destructive of their life. It threw them off their appetite, made them dyspeptic, created accumulations of hard, fœcal matter in the intestines, and the animal died."

Not twelve miles from this place, I know an intelligent farmer who has had the same experience with cotton-seed meal. There are always exceptions. "What is one man's meat is another man's poison." One man may feed his cows gunpowder; another can't. I am talking of the general run of the thing throughout. I have no prejudice against cotton-seed meal, but I insist that the position it holds in the market as cheaper than oil cake and other articles, grows out of the fact that so many experienced farmers have ascertained that it is dangerous to their cattle, or not good for them, at any rate. I state these facts within my own knowledge and experience partly to sustain the views I mentioned yesterday, and partly that the thing may be fairly ventilated. I have no prejudice, I repeat, against cotton-seed meal. I should be glad to have it succeed. If the manufacturers will sell it for half the price of oil cake, every farmer ought to be grateful to them for their philanthropic conduct. But the difficulty is, that it cannot be used with good results.

Mr. Davis. In the cases you refer to, was the hull taken off?

Dr. Loring. It was decorticated meal. Its effect is perfectly apparent, and the careful observer can see it. It is like the effect that you see upon some men who have been through some disease. It is evident to the experienced eye that their constitution is injured, although you may not be able to tell precisely what the difficulty is. But that cotton-seed meal is injurious to the digestion of our cattle I do not hesitate to say; and while some may say that they can feed it with impunity, I would not have it in my barn if I could have it for nothing. I speak of this for the general welfare of the cattle business, and it is one of those matters that ought to be carefully discussed and investigated.

Mr. Smith. I can refer you to some of our best farmers, all through the Connecticut Valley, who have fed it to their cattle, and feed it still. I suppose the doctor and myself will have to call it a draw game. I can see no objection to the use of cotton-seed meal. It makes good butter; it makes good beef; it makes the best manure, because it contains so much oil.

I intended to say one thing more, in regard to feeding steamed food. I do not know anything about it, except what I hear, but it has never seemed to me that steaming straw could make it nutritious. I have wondered how you got nutriment out of poor food by steaming it; but the idea came into my head yesterday that it was possible that by steaming, you got it into such a state that the animal could draw more nutriment out of it. That I gathered from some of the discussion yesterday. I have no doubt whatever that warm food and drink are better for an animal than cold; they will produce a greater flow of milk. But in order to get the best milk or the best meat, we must feed the best food. That everybody will admit. I think Mr. Horsfall does not agree with some of the statements that were made here yesterday. I was reading an account of the controversy, a few days ago, upon this very subject, and the testimony of Mr. Horsfall was, that pork that was fed upon light substances would "stink in the pot," (that is his expression,) and that beef, fed upon steamed food, had not the hardness, had not the substantial qualities that characterize beef fed upon more substantial articles of food. I have considerable doubt whether you can produce so good meat upon steamed food as you can upon dry food.

Mr. Meriam. In reference to the views expressed by the President (Dr. Loring) yesterday, in regard to in-and-in breeding, I have no doubt that all the breeds of animals in which great excellence has been attained—we will take the Durham, for instance, among cattle, we will take the Leicester and the Southdown among sheep—it has been due to in-and-in breeding. The arguments and prejudices against in-and-in breeding have grown out of divine and human laws, and the supposed analogy between the human race and animals. My own conviction is, that the deterioration in highly improved herds, which has been ascribed to in-and-in breeding, has originated in another cause. I believe that where highly improved herds have deteriorated, it will be found to have arisen from the fact that the cattle have been luxuriously fed and kept idle. If you wanted to find a family of children, robust, vigorous and full of life, you would not go among the rich and luxurious, those who fare sumptuously every day, and take no physical exercise, but you would go to some family in the comfortable middle class, where they enjoy the comforts of life, and where the physique is fully and perfectly developed by exercise. Now, I believe that where improved animals have deteriorated, it has arisen, not from in-and-in breeding, but from breeding from animals whose physical and nervous systems were not fully developed. Hence I maintain that it is necessary, in order to have a good stock getter, to have an animal, a bull, for instance, that is fully exercised, so that his physique is strong, vigorous and healthy. I mentioned this subject to Mr. Griswold, who has probably the best herd of Durham animals in New England, and he told me his herd was taken care of by an Englishman, and that his bulls had two miles of exercise every day. "Bohemia," the first year after he was imported, got no stock—he was a high-fed, luxurious liver; and the next year, they made him cut his own fodder, put him into the pasture, and gave him abundant exercise, and he became a good stock getter. I have always found that a bull that is worked is a better stock getter, and gets more vigorous calves than a luxurious, idle bull. I ascribe the deterioration in many herds to luxurious, high feeding, and idle habits.

I suppose this discussion is not confined to neat cattle, and there is a subject in which Massachusetts is largely concerned, to which I will briefly allude. The statement has been made in the "New York Tribune," that the wool of the Angora goat was coarse hair, unfit for anything—hardly fit to make a decent pair of Sunday pantaloons; that the valuable shawls, cashmere shawls, for instance, were not made from this fleece; and that there was no machinery in this country for spinning and using this fleece. Now, the oldest of us recollect, that when the Merino sheep were introduced, many farmers said they would as soon have a skunk upon their farm as a Merino ram; yet the importation of that animal has added millions to our agricultural wealth. It was the introduction of a new agricultural and manufacturing staple! And it has not only done that, but it has kept so much money at home. The introduction of the Angora goat promises to furnish as valuable an agricultural and manufacturing staple. The principle of the manufacture is the same as that of lustre wool; it can be spun in the same way, and with similar machinery. To show that there is no truth in the report of the "Tribune," I have with me three samples of the first cloth, probably, ever manufactured in this country from yarn spun by machinery. The Angora wool is manufactured at Paterson, N. J., at Troy, N. Y., and at

Lowell. On the continent of Europe, they have usually used imported warps. In Vienna, they are weaving both sides of mohair shawls at the same time, on the Jacquard loom, costing about $35 there. A gentleman now travelling in Europe and the East, to examine into the manufacture of this article, carried over samples of our Angora wool, and he writes from Vienna, that the manufacturers there declared it equal to any they had ever seen, and it took equal rank at the Paris Exposition with the best specimens of the European wool. You will observe that there is a lustre upon these cloths. The yarn was spun to No. 32. It could have been run up to No. 50, but all these fine lustre dress goods are made from cotton warps, which are spun from combed cotton; and in order to have them very fine, they must be spun in rooms so protected from wind that the threads shall not be affected by the air. No warp could be found finer than No. 32, and consequently the mohair was spun to No. 32. In order to make the finest fabric, the wool must be assorted; this was spun as it came from the fleece. It was spun on the same machinery that lustre wool is spun on. I have seen photographs of the original Cashmere loom of India, and of the Jacquard loom, on which both sides of a shawl are woven at the same time, and the fabric will compare in beauty, softness and finish with the finest shawls brought from Cashmere. These were manufactured at Lowell, at the mills of the Lowell Carpet Company, and I was told by a gentleman there, who is perfectly familiar with the weaving of carpets, that there is no difficulty whatever in manufacturing this fleece.

Mr. Davis. The gentleman who has just sat down has brought up an inquiry, by a portion of his remarks, which I intended to make, and that is, in regard to the use and management of bulls. It is a matter of practical importance, of course, to every farmer, and I find the question is often raised now throughout the Commonwealth, whether the difficulty in getting cows with calf may not be peculiar to some particular breed. Yesterday and to-day, I have heard the remark made by several, some members of the Board and some citizens of this town, that a difficulty had been found in getting Jerseys with calf. I never have experienced that difficulty, although I have had them nine or ten years. The inquiry has also been raised, which I should like to have answered, if there is any gentleman here who knows anything about it, whether there has been anything of that kind found to be peculiar to the Kerries. I think, from what I have heard with regard to them, and from the inquiries that have been instituted, that it will be found to be the practical difficulty under which Mr. Austin has labored with regard to the products of his importations. I have a Kerry heifer, which is now five or six years old, and I have never been able to get but one calf from her; and it seems to me that the suggestion of the gentleman in regard to breeding in-and-in, leads us to a very important inquiry as to the general use and management of bulls. It seems to be the idea of most farmers, that a bull is to be treated as a gentleman, confined to the barn, pampered, and never exercised; I suppose that is the most usual practice. In every case where I have seen a cow of the Jersey stock which has been found difficult to breed from, she has been either one of great capacity and considerable flesh, or one which has not been exercised and for that reason has too much flesh. For instance: I saw this morning, at Mr. Keyse's, three or four animals, supposed to be of the Jersey breed—bought as such, but showing in the hind quarters some marks of the Shorthorn. He says he has found that same difficulty with regard to getting calves.

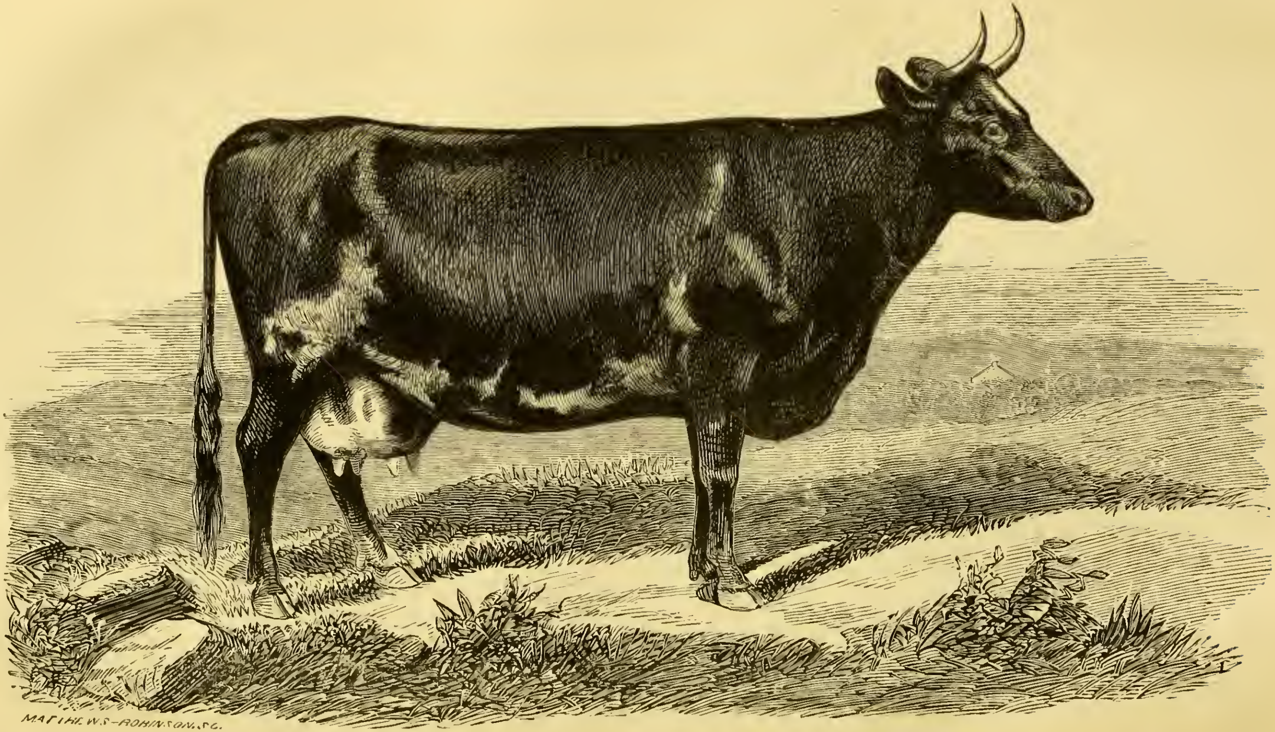
I met a gentleman from Porto Rico, the other day, and he told me that he had, in connection with his plantation, a herd of bulls, and that the teams upon that island were made up of bulls, which were as docile, as easily worked, and as easily taken care of when worked as any animal that we could conceive of. They are universally used, I understand, on that island, for drawing purposes; working every day in teams of four, six and eight. Now, we certainly suffer a great loss of power in keeping bulls as we do throughout Massachusetts, and if there is any well-settled rule with regard to the best mode of taking care of these animals, which are, except in one respect, the most unproductive consumers upon the farm, it seems to me that all of us would like to know it. And if there is any incapacity peculiar to any one of the imported breeds, it seems to me that the inquiry to what it is owing, would be a very important one in this connection.

Professor Agassiz. I should like to ask one question. Whether, in connection with the various modes of feeding cattle, measurements have been made to ascertain the quantity and quality of the milk, so that the relation between the quantity and quality of the milk and the different modes of feeding and different articles of food should be ascertained.

Mr. Birnie. I doubt very much whether there have been any accurate observations made.

Professor Agassiz. I think the instruments by which all these observations may be made with the most perfect accuracy are so easily obtained, that our studies on these subjects should be accompanied by actual measurements, so that the results may no longer be matters of mere general and vague impression. I think a great service would be rendered to agriculture if the lactometer were used to ascertain what is the quality of the milk. There have been some very beautiful experiments made of that nature, and from the reports, (I have not seen them made,) I judge they were neither difficult nor costly; and therefore I think those who are interested in determining the best modes of feeding should do something to ascertain what they get by their different modes of feeding.

N. S. Hubbard, of Brimfield. I recollect one thing that came up in connection with one of our cheese factories. On trying the milk we found there was some difference in the quality, and there was one particular dairy the milk from which they supposed to be adulterated. It was tried from day to day and week to week, until they were satisfied that water was added to the milk, and means were taken to ascertain with regard to it definitely, so that one man should not bring adulterated milk to go in with milk that was pure. On getting at the exact facts, they came to the conclusion that the milk was not adulterated, but that owing to the quality of food this dairy had produced a poor quality of milk. I had been engaged in the business of sending milk to market for some fifteen years, before the establishment of cheese factories. We fed tons and tons of shorts to our cows during the winter season, so as to get the largest flow of milk; but we found that by feeding shorts we were running the cows too hard, and that we needed something to support the cow as well as to get a great flow of milk; and we found, on feeding corn meal, that the cow very soon improved, and the quality of the milk improved. I know the men who bought milk in Boston had a preference for particular dairies; and it was owing, in great


MATTHEWS-ROBINSON, SC.

"FLORA,"—Ayrshire,—owned by William Birnie, Springfield. See Preface to Abstract.

measure, to the mode of feeding practised in those dairies. Take it in the summer season, cows fed in pastures that produce clover luxuriously will always produce a better quality of milk than cows sent to pastures where there is nothing but June grass. And it is just so with feed, at whatever season of the year. If cows are fed a good while on corn meal they will not give so large a flow of milk as when fed on lighter foods. Lighter food produces a larger flow of milk, but it wears down the cow more than it does to feed a better quality of food. I think there is the great difference. Of course the milk that the cow gives is manufactured out of what she eats; and if she eats a better quality of food, the milk must be of a better quality.

Now, with reference to what Mr. Smith said with regard to feeding various things, cabbages in particular. For some eight or ten years I have fed cabbages to my cows in the fall of the year regularly, in moderate quantities, and I have never discovered anything, either in the milk or in the butter, (though we have made butter but a small part of the year because we have been engaged in selling milk and making cheese,) which indicated the presence of cabbages. If the milk or butter does taste of the cabbage, it must be either because it is fed to them in too large quantities, or fed to them when they have been in the habit of having other food in large quantities. Fed to them regularly, at the proper time, in moderate quantities, it will increase the flow of milk; and I have never discovered anything objectionable in smell or taste.

Mr. Birnie. A few years ago I sowed a tobacco bed, and at the same time sowed a cabbage bed. I had very few tobacco plants that were good, but an excellent bed of cabbage plants; the rains came on, and it seemed to be a very favorable time to set out cabbages, and I set them out every rainy day. The result was, my piece was covered with cabbages and no tobacco. I had some five or six acres of cabbages, and they grew tremendously, and gave me the greatest crop of cabbages produced in our neighborhood. They ripened and began to burst before I knew it, and I commenced giving them to my cows, feeling, at the same time, that there was some danger of their tasting in the milk. I had that impression because I had some experience when feeding the outside leaves occasionally to my cows; the milk tasted of the cabbage. But I began to feed them by the wagon-load. I would carry as much as two horses could draw to twenty cows; and I found no ill effects, and heard no complaint. My wife considers herself rather particular about milk; I did not say anything about it, nor did she; and none of the customers made any complaint. I fed a great many tons that autumn—as much as two tons a day right along—to my cows, and they grew fat and gave great quantities of milk. Since then, I have raised cabbages every year for the express purpose of giving them to the cows. They seem to begin to gain flesh the moment they began to eat the cabbages.

I have fed turnips without discovering any ill effect; but when my cows have fed on turnip-tops as they pleased, then I have tasted the turnips in the milk. But where turnips have been fed moderately, in the morning, after milking, I have never heard any complaint whatever.

I was very glad to hear the discussion in regard to cotton-seed meal. I was questioning whether I should buy some for the purpose of feeding my calves. I raise a great many calves every year, and have been in the habit of feeding them oil meal—at first putting a little of the oil meal into the milk, and after awhile withdrawing the milk, and feeding them entirely on oil meal. Calves grow and thrive exceedingly well on oil meal. I have noticed that there is a difference of about $10 a ton between oil meal and cotton-seed meal.

Now, in relation to steamed food affecting the quality of the milk. I have never heard of such an objection to milk produced by feeding steamed food; and I do not believe there is any such objection. For ten or eleven years, I have fed my cattle with steamed food, giving them very little dry hay, and I believe the milk is better, and the cattle are certainly better. They look better; they do not consume so much, and what they do eat is more thoroughly digested; less passes through them undigested. I have often seen statements against it by scientific men. My experience satisfies me that there is a great economy in it, and I am very happy to learn from Prof. Agassiz, that it is not antagonistic to science. I shall continue to practise that method of feeding until I see that it is injurious.

Mr. Meriam. There seems to be a difference of opinion here, among practical gentlemen, with regard to the effect of feeding cabbage and turnips to cattle, some declaring cabbage to be very excellent, strong, wholesome food, and not injurious to the milk, and others holding the contrary opinion. In my neighborhood, the cabbage yields from forty-four to fifty tons of green feed to the acre, and we keep it all winter. A furrow is ploughed by the side of a wall or fence, the cabbages are set in it and covered up, and furnish an abundant supply of green feed for the winter. Cabbage will yield about fifty tons to the acre; that gives a large quantity of feed, and if it can be used with safety to the butter and milk, it is certainly very desirable to know it.

I have some very early English turnips which I began to feed six or eight weeks ago, and it destroyed a churning of butter, and the milk was injured. Mr. Birnie has stated a fact that reconciles this difference of opinion. He states that he feeds cabbages and turnips in the morning, after milking. I changed my time of feeding from before milking to after milking, and I was surprised at the result. The night's milk was not injured, and we were never troubled after we began feeding after milking. I do not find any injury from feeding either cabbage or turnip in that way, and I find them very valuable feed.

Mr. Brown. The suggestions of Prof. Agassiz in relation to the necessity of inquiries to determine the quality of milk, are very important to us; and if the Board of Agriculture will come to some conclusion in regard to the matter, and publish it, so as to set our people to making experiments and investigating the matter, they would do the country a very great service. I have no doubt whatever that the quality of the food affects the quality of the milk; but I have some doubts whether, by the test of the lactometer we can discover the variations. It seems to me it will require some nicer instrument. Now, if I want milk that will give me a large quantity of butter, I send my cows away upon the hills, where the grass is short and very sweet; and if the hills are stony so much the better. Cows feeding on such grass will give milk that will make, I think, double the quantity of butter that the same amount of milk will make when the cows get into clover fields. But if I desire to make milk for our Boston friends to use, I send the cows into the most luxurious clover fields I can find, and then they will give me brimming pails. I have some facts, which I will not stop to relate, upon that point, where exact experiments have been made from day to day, and the variation in the quality of the milk has been shown to be just as certain as the variation in going from one pasture to another. There can be no doubt that the quality of the food does affect the quality of the milk—in its richness, I mean—and that is a point to which our attention should be turned more than it has ever been. We need some well-settled facts in relation to it, which it seems to me the Board of Agriculture can give us better than we can get them from individuals, because we have the aggregate experience of a large number of people; and that is what we want.

Dr. Loring. I want to say one word in regard to roots. Mr. Hubbard alluded to the use of shorts as being injurious to cows, stating that it "run them too hard." I want to call the attention of the Board to the fact, that I distinctly stated, in describing my mode of feeding, that I made considerable use of roots. I can never say too much about the root crop. It seems to me every farmer who is feeding cattle for any purpose should remember that root crops really lie at the foundation of the most economical and profitable feeding. It is a most astonishing thing to me that men should have been laboring twenty years to induce farmers to go into the raising of roots. We have got machinery for planting the seed and cutting up the roots—everything is prepared, and I do not see why it is so difficult to induce farmers to engage in the cultivation of roots. The cultivation of mangolds and swedes lies at the foundation of the most successful farming. That is saying a great deal, but it really does come to that in the end; and why the sheep breeders of Vermont are so slow in introducing the cultivation of swedes, and the cattle breeders of Massachusetts so slow in the cultivation of mangolds, I cannot imagine. The swedes are raised more easily and cheaply than any crop, and the mangolds, considering the small amount of labor and manure required, are really the most profitable crop you can raise for your cattle except swedes.

Mr. Flint. I should like to say one word more in addition to what I said last night in regard to the use of cotton-seed meal. We all know it does not do to draw general conclusions from the result of one experiment, or two or three; and previous to the statements made by Dr. Loring, I think I had never heard of half a dozen individuals, who had used cotton-seed meal extensively, who had found any objection to it; while, on the other hand, I have known certainly hundreds of cases where it has been fed with perfect satisfaction and with the best results. I think there must have been some special causes, in those cases where the result has been unsatisfactory, which were not, perhaps, apparent. I alluded, when speaking of the subject yesterday, to the reputation of cotton-seed meal in England, where Dr. Voelcker has investigated the nutritive qualities of cotton-seed meal as compared with linseed meal ; and I know it has been used there with great success. In a few cases objection was made, and those cases were investigated by Dr. Voelcker and other thoroughly competent scientific men, and it was ascertained, upon getting at the facts, that the objectionable effects resulted from feeding undecorticated cotton-seed. It was found that the hulls collected in a large lump in the stomach, and of course threw the stomach out of order. In every instance that has come to my knowledge where any objection has been made, the injury has resulted from feeding cotton-seed meal which has not been decorticated, or from feeding it in too large quantities, or what might be termed injudicious feeding.

I merely rose to state that I think we should not draw general conclusions from one, two or three cases ; that the subject is worthy of more careful experiment and investigation ; and that, before we condemn cotton-seed meal, we should wait until we have a larger number of experiments ; for so far as I have heard of its use, in hundreds of instances, at least, the result has been satisfactory.

I think we have upon the Board one of the largest feeders in the State, and I would like to hear what his experience has been. It has been suggested that we cannot feed beef cattle in Massachusetts. I understand he has eighteen head of beef cattle feeding now.

H. S. Porter, of Hatfield. In regard to cotton-seed meal, I have been using it for the last ten years with very great success, not only for dairy purposes, but more especially for fattening purposes. I have used it in small quantities—three quarts a day, mixed with Indian meal and shorts, and I have found it very beneficial ; so much so, that I continue to use it, and I have never perceived any bad effects from it. I once thought I lost a very nice calf, that I proposed to push pretty hard, by over-feeding with cotton-seed meal ; but for fattening purposes, I have never seen anything equal to it. I find that those cattle that have been fed with cotton-seed and Indian meal always weigh the best, and so far as my experience goes, feeding with cotton-seed meal has been a great success. I have also used it for fattening sheep. I usually have about one hundred and fifty sheep in the winter, and I feed them a mixture of a quarter or third cotton-seed meal and the rest shelled corn. My neighbors have used it as much as I have, perhaps more, and in no case have I found any objection to it, except where, as Mr. Flint says, unhulled cotton-seed was used. Some thought they hurt their animals by using that, and they stopped at once. But where the genuine hulled seed has been used, I have seen no ill effects from it. I have used from ten to fifteen tons a year, and my neighbors have used it in larger quantities. One of my neighbors has bought twenty tons for use this winter.

Although I have never had any trouble where the cattle were fed with this meal, I have a neighbor who fed cotton-seed meal very extensively to two cows. They were very nice cows, and he kept them in a high state of flesh, feeding them as much as eight or ten quarts of cotton-seed a day. The consequence was, he had a great flow of milk and made a large amount of butter. He claimed that he made eighteen pounds of butter a week from each cow. The consequence was, that in two years, he had to turn them into beef. It dried them up. They were cows that took the first premium at our show, and one of them went as high as nineteen and one-half pounds of butter a week. He thought he was doing a very nice thing that winter, but the next year, he turned one of them. I asked him, with some surprise, "Why do you turn that cow into beef?" He rather hesitated, hung down his head, and said, "I can't do as well this winter as last." "Why?" "I guess I forced them a little too hard." If he had fed his cows a reasonable quantity of cotton-seed meal, say three quarts a day, with shorts or Indian meal, I think his cows would have been good now.

Mr. Smith. I will ask the gentleman a question: If he cannot crowd an animal harder by feeding a mixture? That has been my experience. I have not experienced so much danger of over-feeding or cloying an animal when I have a portion of cotton-seed meal. In regard to the two cows he has mentioned, I have no doubt the same effect would have been seen if they had been fed so high with anything else. I well recollect a very nice heifer that I was satisfied I spoiled by feeding her shorts. I am somewhat persistent in this, because I am strongly in favor of cotton-seed meal from the experience I have had. As I said before, I have used it for several years, and I have seen no unsatisfactory results.

FRUIT CULTURE.

The subject of Fruit Culture was then taken up, and the discussion opened by the Chairman, Captain MOORE, who said:

Fruit culture, the subject assigned for discussion to-day, I need not say to this Board, is one of the leading interests of farmers and gardeners in Massachusetts.

According to the returns of Industry of Massachusetts for 1865, the value of fruit returned amounts to $1,713,240. This does not include the small fruits, but is confined principally to apples and pears, and was compiled from the returns made in a year of a failure of the apple crop to a large extent, and is probably underestimated. To this might safely be added a sum sufficient to swell the whole amount to $2,000,000 for small fruits; this would be the estimated product of fruit for the State.

The amount consumed is very much more than produced, particularly of apples, peaches, grapes and strawberries, most of which are brought from distant places to supply our markets; and this fact shows that there is still room to extend the cultivation of almost all varieties of fruit now grown here, with a reasonable prospect of remuneration to the producer.

With land well adapted to the production of the apple, is there any good reason why we should not only produce sufficient for home consumption, but for export also? I know that some persons say that the apple is failing; that they do not produce as much as formerly.

That there has been a partial failure of the crops for three or four years is true, but is there any crop grown by the farmers of this State, weeds excepted (which never fail if you give them a chance,) which has not at times been a partial failure? Have we discarded potatoes because they rotted extensively, or given up growing English hay when the crop has been almost worthless from drought, or given up the growing of the different grains because they have suffered from blight, rust, or insects? Not by any means, but we have endeavored to find a remedy for the trouble.

And now, while I do not think that it would be advisable to plant apple orchards on good tillage lands worth one or two hundred dollars an acre for other purposes, I am well satisfied that there is a large amount of land, well adapted to the apple, that is not so accessible, free from stones, so well adapted to other farm crops or so valuable, that might well be planted with apple trees and made profitable to their owners. I will not undertake to give any reason for the small crops of the last four years, but can only say that there are a few instances within my own knowledge, where, having high cultivation, very fair crops and quite profitable ones have been grown the last three years.

Then would it not be safe advice to give, in view of the fact that we consume more than we produce, and that the old orchards, having fulfilled their mission, are fast going to decay, to plant such cheap lands as I have described, with the apple, not only for home consumption but for the market? I certainly think that it is.

The pear, which it was considered of doubtful expediency to plant largely for profit, has become one of the standard fruit-crops, second only to the apple in value for general cultivation. This is largely due to the introduction of better, more productive and desirable varieties, for which we are indebted to the liberality and public spirit of a few eminent horticulturists, more particularly to a former member of the Board of Agriculture, Hon. Marshall P. Wilder, and to the influence of the Massachusetts Horticultural Society. These have done a great deal for the public benefit by importing and disseminating new varieties, and by showing the fruit, thus enabling those desiring to plant to make a proper selection of varieties, which, with a good soil and high cultivation, are three of the most important requisites in pear culture.

I will not name any methods of cultivation, as there are others here who will take part in the discussion who are much better qualified to describe the best methods than myself.

As to grapes, they have suffered the present year from the extreme wetness of the season ; and although in amount a fair crop, they were not well and evenly ripened, and they have suffered very much more than usual from mildew. On some varieties both fruit and foliage, on others the foliage alone was affected. The fruit also has been injured to some extent by rot.

Mildew, contrary to all former experiences, and to the theories of writers upon the subject, who usually assign it to low, damp, close and humid places, has developed itself much more extensively on the most high and airy parts of the vineyards.

The west sides of the vineyards in the vicinity of Concord have suffered more than the east. This is the greatest pest of grape-growing, and neither sulphur, nor any other application that I am aware of, has been able entirely to prevent its ravages the present season.

I will not undertake to advance any theories of my own about mildew, and although I have watched it carefully through all its phases, I am honest enough to say that I know but little about the precise causes for its appearance, or the best remedies to apply.

However, this year is an exception in this respect, and may not be repeated for some seasons to come. The safe course will be to cultivate principally such varieties as are comparatively free from mildew.

The following varieties have suffered from mildew in the order named, commencing with those affected the most :

1st "Crevelling," (lost all the foliage, the new wood mostly dead ;) 2d, "Delaware ;" 3d, "Diana ;" (nearly as bad as the first-named ;) 4th, "Iona ;" 5th, "Israella ;" (both these lost a large part of their foliage, the wood of both, however, is apparently alive ;) 6th, "Rogers," No. 15 and 3, (both badly affected, not only on the foliage, but to some extent on the fruit ;) 7th, "Allen's Hybrid" (about one-half of the foliage destroyed ;) 8th, "Hartford Prolific" (a large portion of the foliage injured, none on the fruit ;) 9th, "Concord" (one-half of the foliage of the high part of the vineyard was destroyed, on the low parts, but very little ;) 10th, The "Martha," the "Black Hawk," the "Clinton," (hardly any.)

Most all kinds have been injured by the rot to some extent, but still with all these drawbacks it will take more than one unfavorable season to change my opinion about the entire practicability of grape-growing here.

But, gentlemen, the subject of small fruits is the one that we should more particularly urge upon the cultivators of our State. Not that the former are not important, but that they have already a good start, and are more prominent before the people.

I hold that every person who cultivates a garden, should raise the small fruits to some extent for family use, and coming as they do in the hot season, at the time when such food adds, particularly by its cooling nature, to the healthy action of the stomach, they promote health and are also agreeable to the palate, and save money by keeping away the doctor.

The strawberry is one of the varieties of small fruits, of which every one who has a garden should have a bed sufficiently large to supply an abundance for the family, and when near the market is a profitable crop to raise to sell. The same may be said of the raspberry. Both require good soil and high cultivation to succeed perfectly, and when grown for market, no larger extent of surface should be planted than can be easily handled, both in the cultivation, picking and marketing.

Mr. J. F. C. HYDE, President of the Massachusetts Horticultural Society. The remarks of the chairman suggest to us many things in regard to fruit culture. He has glanced over the whole field, and has touched upon one subject in which I feel a great deal of interest; that is, the failure of the apple. We all remember when apples were as abundant as any crop produced on our farms. Then apples sold for $1 or $1.25 a barrel, and cider was produced for $2 and perhaps less a barrel; while now we are paying $6 a barrel for Northern Spys, and cider is bringing $12 or $14 a barrel. The question naturally arises, "Why this state of things?" A writer in the "New York Tribune" says that New England can no longer produce apples; her soil is worn out, and therefore we must look to the West and the Middle States for our supplies of that fruit. This seems to me to be nonsense. If our lands have been exhausted of those elements which are necessary to the growth of the apple tree and the production of its fruit, is it not possible to supply that which has been taken from the soil? Is it possible that at this late day there is no man among us, (and we have the most scientific man in the world in this meeting,) who can tell us what to apply to those soils, and that we must remain open to that charge, that our soils are worn out and can no longer produce fruit? I will not admit it for a moment.

My theory about the cause of the failure of the apple crop is this. It is well known that we had, three or four years ago, two years in succession, the greatest droughts that were ever known in this part of the country. So extreme were these droughts, that hundreds of thousands of forest trees, where the soil was not deep, were actually killed. I say my theory is, that during these years the apple trees suffered to such an extent that they have since then been incapable of producing fruit. They made very little wood in most cases, and had all they could do to sustain themselves and keep alive without making fruit. In proof of this, I give two or three facts that have come under my observation. One is, that a year ago last spring we had a considerable number of blossoms, and although the season was wet, the blossoms dropped off in many instances, and in others the fruit dropped after it had got to be some considerable size. How do you explain this, you ask? My theory is, that the tree had not become sufficiently strong to carry the fruit; that it wanted more time to recuperate. In proof of this position I give this fact. Three years ago I visited quite a large orchard in Newton, where I live, in a sheltered position, and I found several Nonsuch trees full of fruit. I said to the owner of the orchard, whom I know very well, "How is this?" Said he, "Those trees were watered regularly." "Is it possible that you watered those trees, large as they are?" "Yes, I carted the water and watered those trees, so that they did not suffer from the drought last year." In the second year of the drought, when the apple was an entire failure in our section, his trees were full of fruit. There was no other reason for the difference. If you say it was protection, I say there were other trees, protected in just the same way, with scarcely an apple. I give that for what it is worth. I know it to be so. I think the trees were unable, having suffered in that way, to bear fruit; but they went on recuperating their energies to get into good condition. Last year was not a bearing year, and therefore, if the season had been favorable, we could not have expected a large crop, and it is true that there was not a large crop.

It may be asked, "If the apple tree has suffered to that extent, why has not the pear? How are you going to account for the fact that the pear tree has given us good crops?" But it is not true that the pear tree has given us, during the last three or four years, such large crops as in favorable seasons. Another reply that I would make is, that the pear tree does not require the moisture that the apple tree does. It does not spread itself like the apple tree; it does not make the same amount of wood or foliage. And then, again, the pear, in nine cases out of ten, perhaps forty-nine out of fifty, has better treatment than the apple. In many cases it is mulched or otherwise protected; in many cases watered, and when watered, good results have followed. Again, many pear trees about Cambridge, Roxbury and other places are planted on low, moist soil, where their roots penetrate where there is moisture. I believe it is true of the apple tree that it requires a damper soil than the pear and takes up more moisture because of the larger amount of foliage and wood.

It seems to me that we have thousands of acres lying remote from cities, and yet close enough to railroads to secure cheap transportation, where apples can be grown profitably, if we can have such crops as formerly, for $1.50 a barrel. Why, then, should we go to New York or Michigan and pay $5 a barrel, and then not have them in so good condition as we should get them here? I agree, it would not be good policy to plant apple trees, where land is worth $5 an acre for smaller fruits. In fact, I have taken up splendid Baldwin apple trees from my land, and put them on land that was less valuable. It seemed too bad, but my land is more valuable for grapes and other small fruits. But still, there are thousands of acres that can be profitably devoted to apple culture. I do not feel discouraged about it, any more than I do about my grapes, because my grape crop was a perfect failure. I predict that we shall have next year, a fine crop of apples. The two past wet seasons have put them in condition. I have never seen them in better condition than they are at the present time. I think no one of us who writes at all for the papers should let down a particle in regard to the apple crop. I want to know what people remote from the seaboard could engage in more profitably than apples? Pears do not do so well, but apples do even better there than here. There are formidable enemies to the apple, about cities, especially the canker-worm. This pest remains for a time, and then disappears. I know that the caterpillar has got to be a formidable enemy in some places, but a little vigilance (yes, a good deal is required sometimes,) will relieve us of that. I can show you whole orchards of a thousand trees, where not a nest can be found; but they belong to industrious men, who are up in the morning looking after their trees. I believe these things can be remedied.

We need more light on the failure of the apple. If there are reasons which have operated, and will continue to operate, against the raising of apples, it is important we should know them; and if there is no reason why this failure is to continue, then it is important we should know that, for it is a fact, that there are fewer apple trees planted in Massachusetts now than ever before, and the result will be, if we go on discouraging, as some have during the past few years, the growing of apples in different parts of the State, we shall be obliged to send our money out of the State for this fruit, which it seems to me we ought not to do.

Mr. Brown. How is it with regard to pears?

Mr. Hyde. This year has been one of the worst years for pears that I remember. Certainly, I never have experienced a worse one since my orchard has been in bearing. I have a small orchard of 400 standards and 600 dwarfs, and the pears were so poor in flavor as not to be worth anything; and the same was true of thousands of other orchards, in different parts of the country. In Southern Illinois, they had the same trouble. I think it must have been owing to the wet season. I have never known pears to crack as they did this year. Clapp's Favorite, a variety only about twelve or fourteen years old, cracked in my place badly. You will see that age cannot be the reason; there must be something besides that. Take the Belle Winsor. That does not usually crack, but it cracked this year badly. I never knew it to before. The Buerre Diel cracked all to pieces, so that you could actually see the seeds. Why was it? I cannot tell. I think it was owing to the peculiarity of the season. I cannot give the philosophy of it, I cannot tell how it was, but I know that many trees lost their leaves before August. The Flemish Beauty was good for nothing with me this year, and I fed them to the pigs; and I think they were foolish pigs to eat them, they were so poor. Although my land is rather dry soil, and sufficiently drained, as I think, yet these were the effects that I observed. Even the Bartlett cracked—a variety that I never saw crack before. I cannot account for it in any other way except from the extreme wetness of the season. The season has been one of the most remarkable, take it all together, that I ever remember. It has been cold and wet, and very unfavorable for the full development of fruits. There have been but few varieties that have retained their flavor. There is one variety that I remember particularly, and take pleasure in mentioning, because it is one of the best varieties on the list. The Seckel, the best pear in flavor, cracked, but Dana's Hovey did not crack, and retained its flavor. That is a remarkably fine pear.

Mr. Brown. I want to make one remark. I will not discuss the matter at all. The gentleman who has just taken his seat says that the season has been a peculiar one. I think we have all experienced that, and are satisfied of the fact. But what is the peculiarity of the season? Who knows anything about it? We expect a dry, hot summer in order to get a good crop of Indian corn; but we had, the past summer, one of the best crops of Indian corn, through this region, that we have had for many years. This year our fruit has been exceedingly poor. I have not eaten half a dozen pears of really good flavor; they have been insipid, and some of them almost tasteless. The remarks that the gentleman has made with regard to the worthlessness of fruit this year are entirely correct, and I think they are applicable to fruit in all this region. Now, in what does this peculiarity of the season consist? I wish some of the wise ones would tell us that, so that we may know how to shape our course another summer, when the season is the same. We have got the corn in perfection, and yet we have not got the fruit.

A Member. I would inquire if the tendency to crack in pears has been increasing during the dry seasons?

Mr. Hyde. There are certain varieties that always crack more or less; but this year has damaged some theories that have been entertained by fruit-growers. The Beurre Diel, one of the best pears, if we can grow it smoothly, has cracked badly this year. The theory has been, that in a dry season, the rains coming on, the moisture has been furnished so suddenly that the skin could not expand quickly enough, and consequently it was broken. Now we have had rain enough this season, and yet they never cracked so badly as this year. The St. Michael, the Stevens Genesee, the Flemish Beauty and the Beurre Diel are varieties that have always cracked with me, more or less; they are subject to that defect; but I cannot say that I have noticed that the Seckel, the Bartlett, the Clapp's Favorite, the Lawrence or the Vicar have shown any tendency to crack until this year in my ground; so that it must have been owing to the peculiar season.

Mr. Bull. One thought suggests itself to me in regard to the exemption of Dana's Hovey. That is a new variety, and for the first three or four crops a tree is less liable to disease than at other times. After it has got well established, if the beginning of the season should be dry, there will be a tendency to crack. I think the cause of this defect is that the grown tree, with abundant fruit, losing part of its roots in a dry season, becomes incapable of supplying the abundant foliage with sap as fast as it consumes it, and at the same time keep up a healthy growth of the fruit. It has got to adapt itself to the new conditions. · It must make new roots; then it has got to make its wood and fruit-buds; and so you will find, after the tree has been barren for a couple of years, that it begins to bear again. Now, when a pear tree is young, has just got established, the balance between root and top is in good proportion, and it is exempt from this tendency to crack and from other diseases; but when it has got large and well established, these things come in to affect it. Some of these new varieties, at first exempt, come at last to crack. I suppose that may be the explanation of it.

With regard to corn, we had, during the whole of the fore part of the season, wet weather. The corn started well, and did not suffer from drought. It continued to grow, and the latter part of the season was warm and dry, and ripened the crop well. The late pears were the best. All I got that were fit to eat were those that ripened late, and were not too forward when the warm weather came.

Our chairman has very truly said that this has been a most unfavorable year for the grape. Mildew has affected varieties in localities where they have never before been affected; (I think all varieties have been occasionally affected, in certain localities, though generally exempt.) But this year, none were exempt. The season was peculiarly unfavorable. It has been truly said, that some of the circumstances attending the presence of mildew go to upset many of the theories of the text-books in regard to it. Suppose we look at that subject of mildew for a moment. I confess, I have never been able to satisfy myself that there was any peculiar cause for it. I believe there are various causes operating, some at one time and some at another. I am most inclined to accept Dr. Fisher's theory, that it is due to hygrometric changes. He tells me, that up to the 9th of July—and you will remember the season was, up to that time, cool and wet—his grapes had no mildew upon them. At that time, we had two or three bright and hot days, which they improved to make their hay, and immediately the mildew appeared. It took the upper leaves on his trellises, and was instantly apparent. Immediately after these two or three days, the cool, moist weather returned, and the mildew stopped. That is a very remarkable fact, for according to the generally received opinion, a wet season makes mildew; and we have always believed that the spores of this fungus in the air, in continuing wet weather, found favorable circumstances to grow, and establish themselves. My experience was the same; I had no mildew until that time, and then I found it, as the doctor did, upon the upper leaves. That is one theory. Prof. Silliman, I think, wrote an article upon mildew, which appeared in the "Horticulturist," in which he expressed his belief that it was a constitutional defect, inherent in the vine. I do not think that can be exactly true. I think I can say, that if there is any constitutional defect, if there is a weakness in the vine, it would be peculiarly predisposed to that disease, and so it might ensue under circumstances of such slight provocation as would not affect healthy vines, without that constitutional defect. I think that view of the case is strengthened by the fact, that our weak-growing vines are generally most subject to mildew. I find it to be the case with some of these slow-growing, tender vines, that they lose their leaves in the summer without mildew, perhaps from want of natural force. It does not seem to be sunburn. We are, after a time, possibly, to get rid, through our united experience, of the notions which we have accepted as facts heretofore, and to establish the true rule of the case, according to our experience. Sunburn rarely occurs, but sometimes it does. If the foliage is very thin and tender, an intensely hot sun after a shower will affect the leaves.

I think we have a habit of calling all diseases whereby plants finally lose their leaves, mildew; but I have an idea, (and I think it must be true,) that there are various reasons why the leaves fall, and that it is as improper to say "mildew" for all these troubles, as it is, in my judgment, to say "rot" for the loss of the berry. There is a form of disease which is rot. There is a kind of blight which falls upon the tender grape when first established, upon a certain change of temperature, and prevents it from growing, and finally it falls. The whole vine is very rarely affected in that way, but usually one or two-thirds will be. Dr. Schroeder says the remedy for the rot is continual reproduction, by what he calls the double reverse system, which is only the old system of renewing from the old root, by putting down layers, so that new roots may take the place of the old. Prof. Kirtland, I think, says he is convinced that the Catawba rots because of close pruning and over-cropping. That suggests a solution; because, if you prune close and crop heavily, while you have a well-established vine and large roots, you must disturb the functions of the plant. And it is an indisputable fact that young vines escape the rot better than old ones. I believe there is no instance where a vineyard, in its first or second year of bearing, has shown the rot in its fruit.

Let us look at that a moment. I have said to you, gentlemen, before, that we prune too much. If you have large root-power a great quantity of crude, unripened sap is taken up. It is the raw material to make sap of. It goes to the foliage and is there elaborated and changed into true sap, so as to be made into fruit, wood and root in the proper and healthy way. Suppose you have a vine and confine it to a stake, say six feet high, year after year, or to a trellis which is six feet high, with lateral arms six feet long, (which is generally the space allowed,) and you have root-power sufficient to carry it forty feet in every direction, it is clear that if you do not give it extension you cannot have the *foliage* to elaborate that crude sap into true sap. What happens? Why, this crude, unripened sap surcharges the grape, (and it is precisely for the purpose of getting large grapes that this pinching is practised.) When this crude sap has once got to the grape, the circulation of the sap in the vine and all its natural processes are impeded for want of foliage, and the berry is engorged with unripe sap. There is only one alternative. If nature cannot evaporate the unripe sap from the surface of the grape, if the sun cannot ripen it, it is surcharged with unripe juice, which, when the finer functions of the grape come into play, changes the tissue, rots it, and the grape perishes and falls.

Let me illustrate in the light of experience—not my own simply, but that of others. In the spring of 1861 I planted a vine against the west end of my cottage, which I wanted to cover up rapidly. I did not prune it because I wanted the shade. That vine measured, at the end of last August, eight inches and a quarter in circumference six inches from the ground. It covered a trellis 25 by 15 feet. The ends had to be pinched to keep them from extending too far. That vine has given me, for two or three years, two bushels of ripe grapes—about 120 pounds—a very large crop. During these few brief years it has grown to that size, and I have had these crops. It did not, this year, have any defect of berry, not even mildew, which perhaps was due to the vicinity of the house. I do not think that would save you wholly from *mildew*, but it would save the grapes from rotting. Other vines were affected to some extent, but without exception, my largest and finest vines, bearing one hundred pounds or more, escaped.

Mr. Breck, the worthy ex-president of our Massachusetts Horticultural Society, and a grape-grower of many years' experience, has a Concord vine which he planted near an apple tree for the purpose of allowing it to have its own way and extend as far as it pleased. It has now covered the tree; it escaped mildew, even this year, and all disease, and gave him one hundred and seventy-five pounds of grapes, which ripened perfectly.

There is another illustration given by Dr. Schroeder. His vineyard of Catawbas, after bearing sound and healthy fruit for two or three years, was affected by the rot. He layered from the old vines into the intervening spaces and rooted them, and when they got strong enough to bear, the second year, he separated the new plant from the old root upon which it had been feeding, took up the roots of the old vines, and got two or three successive crops, entirely free from rot again. So he has, by his system of renewal by alternate layering into the intervening spaces, kept his vines young. Now, if you *will* dwarf your vine, I think you will find yourselves under the necessity of replacing it with a young plant if you want entire success.

This subject is worthy of consideration. I dare say others have had the same experience that I have had in the matter; that young vines of those kinds which are liable to mildew and to rot will bear for two or three years, and then, as they get older, will fall into these defects. Therefore, it has come to be a saying among grape-growers all over the country, "True, this new grape is exempt now, but let us wait and see. All others have broken down, and this may." I think all our strong-growing grapes would break down unless renewed or allowed to have sufficient extension.

Denman speaks of a vineyard in Italy one hundred years old, with 100 vines only to the acre, yielding a product of 431 gallons of wine—or four gallons and three-tenths to each vine. It was always in perfect health, or it would not be a hundred years old. The crop comes up fully to the average of all Italy.

If you go into the Burgundy district, in France, where they grow the famous Pineau, which makes the finest wine in all Europe, you will find (as I learn from the same work,) that the vines are planted only twenty inches apart, and they find themselves under the necessity of renewing every year with new vines, one-tenth of an acre, so that their vineyard is never but ten years old. When you consider the well known fact, that the vine in France does not bear fruit until it has been planted five years, you see they get crops only five years before renewing. They find themselves under this necessity, because they dwarf, and they dwarf because it brings the fruit nearer the ground, and it is supposed to ripen better. They know, of course, from their long experience, that it does ripen better, and makes better wine. Not that the grape will not grow to a large size. Chaptal mentions a vine that he says was six feet in circumference. That was probably the Muscat of Alexandria, which was one of the most ancient vines in Europe. It split open and died in the severe winter of 1792. Now, the Muscat is grown in the vineyard in the same way as the Pineau—it is somewhat larger, bearing a full crop. Their experience illustrates what I have said, that there must be a proper balance betweeen the root and the top; that there must be sufficient extension to obtain foliage to elaborate all the sap which the root takes up. If the root is large, the top must have extension in proportion. While it is young, the vine makes its own balance, and for two or three years, you may do pretty nearly what you please with it; but when it has got strong and well established, it justifies what Chaptal has said of it, that it is intractable, and obstinate in its habits; and justifies the remark of our friend on the lake shore, William Griffiths, "When I go into my vineyard, to prune, after twenty years' experience, I feel like taking off my hat, and saying, 'If you please!'"

J. F. C. Hyde. It seems to be still an open question whether any money can be made by the production of grapes. Every one should grow them for his own use, because everybody can do it, but I do not feel satisfied that it would be profitable for our people to engage in it as a branch of business. I look forward to the time when we shall have a variety of the grape that we can grow; but I feel pretty certain that we have not got what we want yet. It may be said, "Why, you can make money at twenty cents a pound." I agree to that. Assuming three tons to the acre, make your own figures, and you see it is profitable. But I can remember selling good Isabella grapes, many years ago, for six cents a pound. Can we grow grapes at six cents a pound, at a profit? A gentleman from Rochester, said he would agree to deliver them for three cents a pound, and make it profitable. I undertake to say he cannot do it—nobody can do it. I think five cents a pound is the lowest, and wine-makers will give that for them. When this fruit gets down to six cents, we can make no money by raising it round Boston. We can put our land to a better use. Still, it can be grown in other parts of the State. There are some vineyards in the State, in choice locations. It seems to me the greatest care and judgment should be exercised in planting grapes. The most famous vineyards of Europe are situated in choice locations, along the Rhine, on steep declivities, where the terraces are built with stone, to sustain the soil. The estate where the famous Johannisberg wine is made, which brings fabulous prices, and is consumed only by the crowned heads and a few noblemen of Europe, is one of very limited extent. What there is in that soil which makes such peculiar wine, I cannot say. But there are choice and peculiar locations, where grapes will do exceedingly well. Grapes have been planted in uncongenial soil and unfavorable locations, and there we may expect failures. I have no doubt that grape-growing will be condemned because of these failures, but the fault was not in the grape; it was in the location, or perhaps in the nutriment the vine received.

Now there are any number of theories and any number of modes of practice in regard to the management of the grape. I feel as though I did not know but little about this matter, though I have been engaged in the business all my life. I will give you a few facts. Twenty-five years ago we had in the rear of our house a plum tree, so situated that it had only the morning sun until ten or eleven o'clock. On that plum tree grew an Isabella vine. It never was pruned; it had its own way; it extended all over that tree, and during all the years that I remember of its fruiting it never failed to ripen. I will say, in that connection, that I never have succeeded in ripening the Isabella so well but once since, with all our improved methods of training. It was protected by the house, and I do not think the mildew or rot ever affected it.

I have on my place a native grape—I mean a grape taken from the woods—planted there about fifteen years ago. It runs over an old black cherry tree. I never have failed to get a good crop from that vine. It never has received any treatment whatever. It takes care of itself—never mildews, never rots, and always ripens its fruit more perfectly than any vine I have had; and I have had two thousand. Right opposite, and within twenty-five feet of it, I have the Concord, which I have relied upon as the most valuable, take it all in all, in the country. That proved a perfect failure this year—a complete and downright failure; the grapes were not worth picking. I planted at the rate of eight hundred to the acre, trained spirally to posts six or seven feet high. My crop was a complete failure; I did not sell five dollars' worth of grapes, and I should have had two or more tons. The foliage mildewed, the grapes rotted, and there was bunch after bunch with not one perfect berry upon them.

Take the Delaware. And right here I wish to say, that the theory that the vine makes too much wood, and is more apt to become diseased when over-cropped and over-pruned, will not apply to the Delaware. It is a slow grower—makes but little wood. I do not have to trim my Delaware extensively, and yet the Delaware mildewed with me so that I did not get a ripe bunch of grapes. It has mildewed, so far as I have heard, all over this part of the country very badly. About the Crevelling, I say, nearly as my friend the chairman has said, that it does not ripen its fruit well, and it does not yield as it did, though I admire it as a grape. Rogers' 15 has worked badly with me. It is a very rampant grower indeed. It will not bear cramping. You cannot confine it to a stake and have it do anything at all, I am perfectly satisfied. I know a vine that yielded seven hundred bunches of perfectly well-developed fruit that ripened nicely; and yet my large vine, that I cut in on the spur system and train spirally fails entirely. It makes an immense amount of wood and foliage, produces grapes that set sparsely upon the bunch, and then rot and drop off. It is as utterly impossible to grow them on a post as it is to grow some other of the more rampant growers in that way, and I should not recommend it. If a man wants to plant one of these vines he must give it room—allow it to grow.

Rogers' No. 4 did not ripen. It is no earlier than the Concord with me. Where it will ripen, I think it is one of the best market grapes—not for quality, but for appearance. No. 19 resembles it very closely, and rotted badly. No. 3 rotted badly. No. 7 mildewed so badly, that I have thrown it off the list. It will lose every leaf before the first of August. Nos. 3 and 9 I have thought considerable of, though I find that No. 3 mildews. With regard to the Iona, it has never mildewed very badly, but I have never ripened its fruit so that it was good. It is a grape of rare excellence—in the mere matter of quality, behind no grape in the country. My Israellas are not well established, but even they mildewed badly. My Hartford Prolifics, which have never shown any unfavorable tendency until this year, about the last of July showed a kind of rot that

I did not see on any other variety. It had spots of black, bitter rot, and my Hartfords did not more than half ripen their fruit this year. These Hartfords were on stiff, gravelly soil, well drained—a poor soil, and yet a soil that I regard as favorable to the grape—and a year ago, I had a magnificent crop. There were bunches weighing a pound on my vines, and I found that the grapes averaged about fifteen pounds to the vine. The vines were four years old—three years planted. That was excessive cropping, and may account, in part, for the failure this year.

One word in regard to summer pruning. I plant my vines six feet apart, and you see I cannot allow a great deal of space to each plant. I have therefore been in the habit of pinching back to the first bud beyond the last bunch. I do that, usually, two or three times during the summer. This year, I thought I would adopt a different plan, and allow the vines to make more wood. They made laterals six feet long, and ran into each other. I have failed this year; whether owing to that or not, I cannot say; I think not. My object was to strengthen the vine and let it make more wood, and not confine it and cramp it, as some caution us against doing.

I have tried some experiments in regard to manuring grapes, and I think we should manure very sparingly indeed. You cannot get any Diana fruit, if you manure it at all. I took the waste bristles from a brush factory and used them as a mulch—I did not dare to plough them in, because, as you know, they are very rich in nitrogen. I used them as a mulch, but after they had been there one year, I became satisfied that they were injurious, and raked them off. I would not apply coarse manures, but bone-dust, ashes, and old, thoroughly decomposed stable manure can be used with good effect.

I am satisfied that it is not best to work the soil frequently during the summer in the vineyard. I am satisfied that I injured my grapes last year by cultivating the soil frequently among the vines during the time of the growth of the berry. It is necessary, of course, to keep down the weeds; but I do not believe that it is well to go through the vineyard in the summer, when the roots are near the surface, even with the cultivator, which runs only two or three inches deep, for it will tear up the roots. I believe it is better to give them a thorough cultivation in the spring, and keep down the weeds by mulching. About this matter of mildew in the foliage, I am at a loss to account for it. I am not in the habit of doing anything to prevent it. Sulphur is very highly recommended, and I have tried it, but did not see any very great benefit resulting from it. It is a very singular thing that in certain places there is no mildew. I was at Washington a while ago, and I went down to the experimental gardens. They have a very competent man in charge, and he has tried the experiment of building a roof over his vines, which protects them from the drenching rains, and from dew at night, and, to some extent, from very sudden changes of temperature. Wherever that roof was I noticed that his vines were free from mildew; and I have seen a communication published by him since, in which he says that the vines were entirely free from mildew where they had that protection, but his other vines mildewed. I have no doubt that this is the explanation of the healthy condition of the vine to which Mr. Bull referred as growing upon his house. That is just what the grape wants. It is not subject there to the alternations and fluctuations of the weather. For instance, the sun being in the west, its rays fall upon the house, the wood absorbs the heat, and the grape is kept all the time warm. I am confirmed in this theory by the fact that there is no difficulty in raising Allen's Hybrid, the Sweetwater and Black Hamburg, in some instances, in the city, which I cannot do anything with in the country. Grapes need protection, and if you give them that protection you will see beneficial effects. Some four or five years ago my men were digging up some stones in a lot where we had some melons planted, and about one hill they piled the stones six or eight inches high. I told them to take them away, but they said they wanted to try an experiment, and they did, and taught me something. Those vines were as large again, at the end of ten days or two weeks, as the vines about them, everything else, apparently, being the same except these stones. They absorbed a great deal of heat and kept the melon vines warm through the night. The same is true of grapes. My friend Brown has his Concords trained over the rocks back of his place, and his grapes are all right; he will never fail to have crops. So in Boston you get not only the direct heat of the sun, but the reflected heat from the walls of buildings.

Now, I am going to try this experiment. You will laugh at me, perhaps, but I do not care if you do. I am going to put a pile of stones a foot deep round some of my vines, and I am going to put an acre of vines into trees. My object is to get fruit, and if I can do it by letting the vines run into trees better than in any other way, then I will do that. "Is it feasible," you ask, "to grow trees for that purpose? Will the vines grow there without injuring the trees?" They do it in Italy, and why should not we? I am satisfied of one thing, that we prune too much. There is no question about it. The Concord grape will not bear all these processes of pruning to which we subject it. That is rather a rampant grower. I am satisfied that that is one of the causes of my failure this year with the Concord.

One word more. I do not condemn the Concord. More than half my vineyard consists of the Concord grape. I say it is the best grape, take it all in all, for market purposes, but I say that the grape for the vineyard is yet to be introduced here. It seems to me we want a grape of the size of Rogers' No. 4, of the quality of the Iona, of the hardiness of the Concord—and more so, because that rots in certain seasons.

Mr. Bull. You ask for a good deal.

Mr. Hyde. I do, and I am looking for just that good deal. When we get a grape like that, we can grow grapes with more certainty than at the present time; but, meanwhile, we must work along and take the best we can get. There are parties who advertise that they have 300,000 seedling grapes, and everywhere we find seedling grapes. May we not hope that out of all these we shall get the grape we want?

Mr. Brown. Reference has been made to the effect of the morning sun. What is the value of the morning sun, say until ten o'clock, as compared with an equal time later in the day?

Mr. Hyde. I cannot answer very accurately. I am of the opinion that the morning sun is the best. A single word in regard to mildew. My experience agrees with that of others. It follows upon sudden changes in the weather. If we have a hot, scorching sun, and then a shower, you will see mildew.

A Member. Does not this morning sun produce these sudden changes which you dread?

Mr. Hyde. No, sir. I do not think we can improve on nature in that respect. The Almighty has arranged that matter a great deal better than we could. We have the sun gradually growing warmer and warmer, until it has attained its highest temperature. It is not that. But you take a day in summer, with the wind south, and your thermometer way up among the nineties; then comes a shower, the wind shifts to the north, and your mercury goes down until at night it is very chilly. These are the changes to which I refer.

It seems to me the mildew must be accounted for by the wet season. You will find that the mildew extended back into the interior as far as Syracuse, N. Y. At Rochester, they had an exceedingly dry season, and they had no mildew. The Delaware ripened perfectly. I was in Missouri, in September, and it was very dry all through that section of country. At Mr. Husmann's place, the vines were free from mildew. The Catawbas in the older vineyards were rotting badly. They had been spurred in very close. The new vineyards, that had only borne three or four years, bore healthy fruit; and I think in all directions where they had a dry season, there was very little mildew—scarcely any at all.

I was up at Madison, Wisconsin, and I never saw a finer display of fruit than I saw there. Rogers' Hybrids were very promising. The Delaware grew finely; some one went so far as to say that it grew more than the Concord. Coming back East, I found the grape was a total failure. The excessively wet season must be the cause.

Professor Agassiz. I was born, and have lived two-thirds of my life in a grape-growing country, and I feel deeply interested in the question, how the grape shall be grown here successfully. But I think it cannot be grown with perfect success until a prejudice which exists throughout the whole country is overcome. It is because I know that it is a prejudice that I would openly speak about it. Wine-growing countries are the regions where temperance prevails; where there is no drunkenness. They are countries where the traveller is helped to a glass of wine to warm and strengthen him; they are countries where the clergyman holds it to be an act of charity to give a glass of wine to him who needs comfort. That is the character of wine-growing countries. Here, the use of wine is considered a sin, and men who use it are considered men not deserving to be in the company of gentlemen. Now, I will say, that before I came to this country, now twenty years ago, I had never taken a glass of water over a meal in my life; and I will say another thing, that as long as I have lived (and I am sixty,) I have never been flushed by the use of wine; I will not speak of drunkenness. I know that my mother gave her children (myself among the rest,) wine as soon as they were weaned, and I know that I have done the same with my own children. But, gentlemen, until you have overcome the prejudice which exists throughout the country against the use of the pure juice of the grape, as a daily beverage, you will never bring the cultivation of the grape to its right foundation, and you will not receive from that crop the return you are entitled to obtain. In countries where the grape is cultivated as the principal crop, the product from the sale of the grape is not the chief reward for the culture, it is the wine; and you will not be thoroughly successful, you will not have that variety of grape, you will not have those diversified modes of cultivation, which will secure its production on a large scale, until you have introduced the use of wine as a daily beverage in every household, and as the most wholesome beverage that can be added to any other manufactured article of food.

Mr. KEYES. I think we can say that we are getting bravely over that prejudice in Massachusetts.

Professor AGASSIZ. I wish not to be understood as saying that the use of liquor is a thing uncommon in wine-growing countries. It is only in those places where wine cannot be had cheap that brandy or alcohol in various shapes is taken as a substitute. That is not what I advocate. The evil results of the use of distilled liquors I know as well as any other man. I do not suppose that I need to insist upon that, in order to justify the remarks I have made in reference to the use of the unadulterated product of the grape in the shape of pure wine.

Mr. BULL. I was thinking, after I sat down, that the pruning of the grape has a very close relation to the disease of the vine. For instance, our friend, Mr. Hyde, who has closely pruned the Concord, has suffered severely—worse than any other person I have heard of. In my experience, those vines which were not pruned heavily escaped. Now there is a proper relation in this matter which I do not think, up to this time, we have been able to understand; and one reason for it is the different habits of the different kinds of grape in the matter of growth. The slow-growing Delaware should scarcely be touched with a knife; and yet some slow-growing vines must be pruned in moderation in order to get hardy and mature wood, or you run into mischief. Weak wood will grow scanty fruit, will not mature it properly, the evil grows worse and worse, and you lose your vine at last. These things all require observation, experience, skill, on the part of the grower, and, as I say, they are so qualified by different circumstances—hardiness of grape, vigor of growth, length of season required to ripen its wood and mature its fruit; in one word, you have to adapt your method to each vine so absolutely that no fixed rule can prevail.

Now, then, if pruning the vine will affect its health, that is an important subject to be considered. Let us look at that a moment. The best Delaware grapes that were exhibited at our cattle-show, in October, were brought by a plain farmer who knew nothing about grapes, who had not pruned it at all, but let it grow up into an adjacent tree. He said it had got out of his hands, and so, instead of trying to restrain it, he took a whole cartload of compost and tipped it up on the root. (The Delaware must have high feed or you cannot do anything with it.) That vine grew remarkably, bore a large crop for a Delaware, (which does not grow a large crop,) and the finest and largest bunches I have ever seen.

Pruning must depend, to some extent, also, on how you train your vine. If you train it on a pole you are limited to your six feet; or, say you have two stems, to your twelve feet. You are immediately brought into this difficulty, that you must prune closely, because you have not room for your branches to extend; your vineyard would be a swamp, and you could not get among the vines; you must continue to summer pinch, also, which is the very thing you want to avoid, except the first pinching, which is legitimate. When your branches are only one or two feet long, and your blossom buds are set, you can pinch off the end and the sap is sent back to the bunches, and the growing leaves, then young and able to expand easily, will grow broad and large. Now the end bud pushes again, and what do you do? You pinch it again. Your mischief begins then. You must let it grow. For that reason I do not use the pole. You must have extension. I think the pole will do for the Delaware, and as it does not make much wood, the fruit will not be sheltered by the foliage so much as to intercept the rays of the sun. But if you have a strong-growing grape, like the Rogers' or Concord, you must adopt another method. Take the espalier. Let it run north and south, if possible, because you get more heat to the root in that way, and then train on the espalier, one arm or two, as you please. In the method copied from France, which has recently been popular, the several arms from the vine are led off diagonally, one above the other, commencing near the ground, and going on until the upper arm, in its diagonal course, reaches the top of the espalier; the next one will be, of course, a little under it, and so your espalier is all covered, and you spur that whole length. Now, then, whether you have two arms or one, whether these diagonal branches are single or double—going both ways—these spurs will make long shoots in the summer time, which, if you do not pinch them, will grow into these wide spaces, and ultimately they will nearly or quite reach the middle of these spaces between the espaliers. When you come to the time of pruning you must not prune your spurs too close, for if you cut back to one or two eyes, or even three, if the wood is strong, you will find you will not get so much fruit the next year, nor the best fruit. Let me speak of the Concord in particular—the variety I have had the most experience with; but the same argument will apply to all the strong-growing kinds. You should leave your spurs far enough apart to prevent their crowding each other the coming season. They should be, if possible, twelve inches apart, and not less than five buds should be left. I have left the whole of the fruit-bearing wood on some of my old vines this season, and from my experience I believe it is the best way. Now, then, the coming year these spurs, which are extending out from the espalier, should be led out laterally, on the line of the espalier, so that they shall not go forward into the open space so much as to crowd it. Again, your upper branches, which formerly lay upon the upper bar of the espalier, will grow into this space if you do not summer pinch them. You see the reason, then, for these spurs being put so far apart as twelve inches, so that the leaves will not lie upon each other, and so perish for want of air. If mildew appears, and your upper leaves go, you have a large body of foliage on the long-growing shoots below them, which have been saved from mildew by the shelter of the upper ones.

Let me say, in regard to the Concord, that up to this year I have ripened my whole crop without rot, except here and there a berry, and without mildew. This year one-third part, perhaps, of a bunch would be unripe and unfit for market. The unripe berries were scattered in the bunch ; they ripened unequally, so that they were not marketable. Still this is the eighteenth year since my Concord first bore, and it is the first year it ever failed to ripen its whole crop. It has never failed to give me a crop during the whole eighteen years.

Let me say a word, in passing, about the profits of grape-growing. I have had considerable experience in that direction. I find it the most certain crop I grow. It never has failed. I expect, confidently, from five to seven tons to the acre ; I do not think I ever made so small a crop as half that. Suppose you take three tons to the acre, at ten cents a pound, there is $600 an acre ; at five cents a pound, $300 to the acre. A constant income, observe. The crop does not fail. It did not fail this year ; it suffered. In those two instances where the destruction was absolute, it was clearly to be traced to the imperfect method of culture ; scientific, I grant you, according to the books—quite too much so, but not the best method, in my judgment. Take half a crop, three tons to the acre, at five cents a pound, and you have a constant income of $300 to the acre. Tell me what husbandry will pay so well as that ?

Mr. Hyde. A great many things will pay better. Strawberries will pay a thousand dollars an acre.

Mr. Bull. I will not combat your proposition, but I will state what I have learned about it, upon inquiry. You will observe, the grape requires very little labor, very little care. You plough in spring and keep down the weeds in summer ; your vine is hardy ; you never take it down ; there is no tying up, it fastens itself there ; you let it run into space. You do not put on much manure. You want a little dressing—lime, phosphate, in some form, wood-ashes, and, if your vine grows weak, some nitrogenous manure—perhaps guano and ashes would be the best. The cost, then, of manuring and keeping your vineyard up to the time of harvest (I am testifying from my long experience, and other grape-growers will corroborate the statement,) is not greater than that of making a corn crop. When you come to the harvest, your grapes may be picked by invalids, old people, children, just as well as by strong men. It costs you very little to harvest. After harvesting, if you want to make your grapes into wine, you can make 600 gallons in a week or so, going through all the processes, with an ordinary press, like a portable cider press. If you send the grapes to market, you would want them picked carefully, and it would be more trouble. They have brought in the market, when perfectly ripe, twenty cents a pound. The market broke down this year, not with an over supply (because there was not an over supply, nor so many as last year,) but because they were really not fit to eat; the season had spoiled them. Persons who ate them found that, instead of being digestible, healthful, comforting, they were the opposite, therefore they would not buy them, and therefore the market broke down. I have no idea that so low an average price as ten cents a pound can ever be reached. I have no idea of it, because I remember that, thirty years ago, the market price of ripe Isabellas was but ten cents a pound, and now, with the abundant supply that we have from the West, they sold, last year and the year before, for ten and twelve cents a pound; in some rare instances, very perfect bunches sold for a shilling and twenty cents a pound. Now, the Concord, or any other grape, should be sent to market only in its best condition. Your best and handsomest bunches are the profitable ones to sell; they will bring you the most money. The remainder you should make into wine. There are many reasons why you should do this, I think. In the first place, it saves you from all loss from imperfect bunches; they are turned into money, through the wine. You want to sell the wine; but if every man makes his own wine, out of his own vineyard, from the imperfect grapes which he cannot send to market, my word for it, you will not drink those intoxicating drinks which it is the habit of our people now to use, because, as I think, they do not have these wholesome drinks of domestic manufacture. You have had testimony to that effect from gentlemen who must be accepted as authority in this matter. In the work I have quoted, Denman's work, on "The Vine and its Uses," there are abundant quotations from eminent travellers, physicians and others, in wine-growing countries, all going to prove that where the vine is found, in most abundance, there is no intemperance; that the people are healthy, temperate, thrifty and cheerful. A clergyman of this State, who passed two years in France for his health, going all over it, for the most part on foot, told me that in all the wine districts he found temperance, but the moment he got into those districts where the grape could not be grown, where they drank beer and brandy distilled from the potato, and from beet-waste, there he found intemperance immediately. And that is the universal testimony. Now, all the world will have stimulants, for necessities; for debility arising from sickness, or age, or that form of disease—if it is a disease—dyspepsia, where you cannot digest your food. Physicians prescribe stimulants, and until an abundant supply of wine is made, these noxious drinks will be used. It seems to me that it is not only better for us to use wine, but better for the cause of temperance. I believe that, and I have acted upon it. My cellar is full of wine. I will not sell it against the law. If the law never permits me to sell it, it will stay there until my friends help me to drink it. I might have received as much money, perhaps more, for my fruit upon the spot, but I thought I would work out the problem for the benefit of the State, and for the benefit of temperance. I was once an ardent temperance man, and believed and said that spirits should never be used by anybody, sick or well. I believed it, honestly, and I urged it upon our people. By-and-by, I fell sick myself, and my physician said, "You must take spirit with your dinner." I objected; said I could not do it; that I did not believe in it; that I had always preached the other doctrine, and I would not do it. I did not do it; for a whole year I suffered, until I was finally driven to it, and then I began to think that possibly I might be mistaken. Now, since it is certain that stimulants must be had, it would seem to be wise to supplant those which we have, which lead to intoxication, and have a wholly different effect upon the system from pure domestic wines, by wines made in our own land. They will be light. Wine cannot be transported unless it is strong, and therefore the foreign wines are strong.

But I am wandering from the question. There are other aspects of this question which I should like to touch upon, especially that to which my friend Hyde has referred, in his suggestion with regard to the necessity of getting, through reproduction by seed, better grapes than we have got now. I should like also to touch upon the question of cross-breeding, or hybridization; but I have already occupied a good deal of time, and as the usual time of adjournment has arrived, I will move that we adjourn until 2 o'clock.

The motion was carried, and the meeting adjourned until the afternoon.

AFTERNOON SESSION.

The Board met at 2 o'clock, Capt. Moore in the chair.

Mr. Brown. I would like to ask Mr. Bull one question—whether his poor grapes make good wine or not?

Mr. Bull. No, sir; it takes the best grapes to make good wine. Poor grapes will make the best vinegar. Vinegar made from wine is superior to that made from cider. It carries the flavor of the grape, and is generally worth twice as much in the market.

Our friend Mr. Hyde says he wants a grape that shall be hardy, handsome, large and excellent. Well, we shall have it in time; but that is a work of time. Your seedling is a good many years coming into fruit, and when you get it it may have some qualities that you do not want. I think we have good ground to hope that we shall find it in the end, for out of the many thousand seedlings which I have raised, I have twenty or thirty, all of which are *better* than the Concord and an improvement upon the parent, and some of which, grandchildren of the Concord, are of exquisite quality, perfectly hardy, and ripen before the end of August. I take this method. If I have a grape which is eminently large and handsome, but not of quite so good quality as I want, I plant the seeds of that grape, (making a proper record of it,) and grow them, in the expectation of getting equally large grapes among its seedlings, and some one of better quality. If I have one eminently beautiful, but not equal in other respects to what I want, I plant the seeds of that by themselves, (keeping the same record.) So I follow up all divergencies just as you keep the record of each family of your blood stock when breeding them. I keep each variety by itself, instead of promiscuously throwing them together. I keep the white grape by itself, the black grape by itself, the early by itself, the large and handsome by itself, and each quality by itself. I follow them all up and put them upon the record, and breed in successive generations from that point forward. In that way you may be sure of hardy vines; in that way you may ultimately get, I hope, all those qualities in the grape which are so much desired.

It has been recommended that the seeds be put, in the autumn, into a pot, and placed in the greenhouse, where they will vegetate readily, to gain by that method the winter growth. But I do not think it a wise method. I think a seedling born in a hot-house and nursed in that atmosphere is very likely to be debilitated. I know that if they grow in the open air they are almost certain, (in my experience I should say absolutely certain,) to be hardy, at least, and of vigorous growth. The quality will be various, to be sure, but you will be sure of that prime necessity, hardiness.

My method is this. In the autumn, I prepare a bed with the spade, turning over the ground to the depth of the spade. I enrich it with phosphate of lime, with wood-ashes, and with nitrogenous manure. You may use saltpetre or nitre. Night-soil, well composted, is perhaps equal to any other. I make the bed rich, so that when the young seedling starts, it may find abundant nutriment. I plant my seeds in this bed. In the spring, when they start, the young leaves are very tender, and must be shaded, at first, from the hot sun. After they have two or three leaves, they require no more care, except, if the season prove very dry, an occasional watering. I leave them in that seed bed usually two years, during which time they make strong roots, get well established, and make a good piece of ripe and strong wood. Then I transplant them. They need not be more than two feet apart, because they will shield each other from the hot sun at that distance, and you will have so many to reject, that there will be space enough for the remainder. The soil is prepared as you would prepare it for corn, with the addition (which must not be forgotten,) of phosphates and wood-ashes. There they grow, two, three, or four years more. I have had them remain ten years sometimes, before bearing, but rarely. In the fifth or six year, they will bear, and when they get their first bunch, you will be able to say pretty nearly what they are going to be;—not quite, because, as they grow older, the quality, etc., improves. If it is good at first, you may be sure it will be better afterwards. But among them you will find a great many which will revert back to the wild stock from which they sprung. Some of them will be wilder than anything you ever saw before, in the first generation. I had some of the Plymouth County white grape sent to me—beautiful to look upon, and very good to eat; and I expected confidently to get from them a large, fine and improved white grape. I obtained two hundred seedlings; I had fifty fruitful ones, and not one of them was white. They were black, mostly; two or three were red or brown. Some of them were sweet, but not a sufficient advance to prompt me to go on with that experiment, because I had already got beyond the second generation with the family I was experimenting upon.

Let me say another word about famous grapes. There is not to my knowledge, in this country (though hundreds have been raised,) a seedling from the Isabella equal to the parent. It is not, in other words, a good breeder. That has been true, until recently, if it is not true now (I believe it to be true now,) of the Catawba. Though it has given seedlings bearing larger berries, it has never yet given a grape equal to itself for the table or wine, unless the seedling which Mr. Poesel the German wine-maker at the West, has on trial should prove to be a better grape than the Catawba.

Mr. HYDE. The Diana is from the Catawba.

Mr. BULL. It is; but the great majority do not consider it equal to the Catawba to-day. I like it; it has a peculiar flavor, most agreeable to me; but I never saw a Diana equal to the Catawbas we had on the dinner-table to-day.

Now the Catawba is better in some localities than others; and so, also, the Diana. It is claimed for the Diana that at the South it is superior to the Catawba. I can well imagine that to be true, because soil and climate have great effect upon the quality of the grape. I have seen Isabella grapes grown in one location so sour you could not eat them; and I have seen Isabella grapes grown in another location—in Boston, on the side of a house—that were exquisite. Location, season, soil, vigor of vine, mode of pruning—all these go into the quality of the fruit at last. But wherever a family of grapes is found that does produce better grapes than the parent, that would be the best to work with. The Concord has already produced, in other hands than mine, admirable grapes. Mr. Miller, of Pennsylvania, has grown, from seeds which I sent him in 1856, a large white grape, described as sweet as honey, and large and handsome in bunch. I have seedlings from the Concord better than it, and grandchildren better than the children.

Now if, in four generations, I have made that constant improvement, then I think we may be encouraged to believe that sometime in the future, though we may not see it, in the course of half a century, perhaps, we shall have grapes equal to the choicest of those in Europe. An eminent French gentleman told me, after eating some very ripe and fine Concords at my house, that he believed we should have the best grape in the world and the best wine in the world. It would not be like the wine of other parts of the world, but it would be better. He explained that the too pronounced flavor of our grape would be ameliorated to a rich flavor, that would surpass the simple sweetness and delicacy of the European grape. I think our friend Mr. Flint, who saw the White Riessling in Germany, has stated that he found it harsh ; and yet is a good wine grape. That seems to be true of the grape—that if it be harsh for the palate, and even unfit for the table, it may yet make excellent wine. That is the case with the grape that makes port wine. It is almost inedible it is so rough, yet the wine, when old enough, is the finest wine in the world.

Now I want the members of the Board to help me work out this problem, because, in the multiplied instances of reproduction, we shall be more sure to meet with perfect success. If you grow a seedling in soil like mine, and a location like mine, and where all the circumstances of climate and weather are the same always, it gets fitted to these conditions, perhaps, and accomplishes what it is equal to under them ; but if it be grown under other circumstances, in other soil, some of which would be more favorable, in a different climate, if, in short, you bring it under the effect of *different* influences, you would be likely to have a different and possibly better result. *You multiply the chances of success.*

I met a veteran pomologist in Boston who had recently been to the West and to Europe, who is pretty confident that the Concord is a hybrid, and who believes in hybridization as the only method of improving the fruit, and that seedlings apparently not hybridized have been accidentally hybridized by birds or in some other way. He believes that the improved pears are to be the result of such hybridization, either done on purpose or by accident. Now, with regard to the pear and other large-blossomed fruits, it is very possible, because large insects can get into them, and, going from one to the other, may carry the pollen of one, when it is ripe, to the stigma of the other, the pollen of which is not ripe. But with the grape it is different. Not only is the blossom so delicate and frail that it will not support an insect of any size, but the pollen is ripe, almost uniformly, before the calyx is thrown off; and in the act of throwing off the calyx the pollen is distributed upon the stigma, and it is instantly impregnated by that act. The warm sun in mid-day gives the calyx a sudden impulse and it flies off; if you have a magnifier in your hand you can see a delicate cloud of dust in the air; and if there is a grain of pollen deposited upon the stigma it is instantly impregnated. Occasionally the elongation of the anthers will throw off the calyx before the pollen is ready, and in that case you can impregnate it; or if by any accident the pollen from another grape vine should fall upon it, it would be impregnated. These circumstances would very rarely, if ever, occur together; but still, it is not impossible. There are other cases where spontaneous cross-impregnation is possible, without the aid of man. Suppose you take an Oporto grape, which has naturally defective stamens; they do not seem to have vigor enough to throw off the calyx in due season, so that oftentimes there are but three or four berries set upon a whole bunch; and yet the germs were there, and the stigmas were ready to be impregnated. Now those unimpregnated stigmas might have the pollen from another vine shaken upon them by the wind, or in some other way, and thus cross-impregnation takes place.

I think the better method is, to watch your vine until some of the calices begin to fall, and then, with a delicate pair of tweezers take them off, and with a pair of sharp scissors cut away the stamens, and impregnate artificially. That can be done, with the aid of a powerful magnifier. I have explored this matter pretty carefully. I have observed with great patience, in two cases, this very thing. I have raised hybrids; and I found it necessary to go through all this careful method. I have spent the time, under glass, where I could see, from that moment in the morning, when, under the stimulus of the advancing sunlight, the blossoms began to throw off the calices until that time in the afternoon, when they ceased to be thrown off (usually from nine o'clock until four,) with a powerful magnifier, and an assistant to help me, watching this process, and attempting to effect this artificial impregnation; and I have seen that in nine cases out of ten, there is instant impregnation. In the tenth case, whether you take off the calyx yourself, or find one where the pollen on the anthers has not effloresced, but is close and compact, you will introduce the pollen from the other grape. You cut away these stamens, and with a delicate camel's hair pencil, put the pollen on the stigma. In two hours after the pollen has been put upon the stigma, you will see the germ, which was before perfect in form, begin to swell irregularly, so that, under a powerful magnifier, it will look like a swollen specimen of the Duchesse d'Angouleme pear. If not impregnated, it will retain its form until it perishes.

Hybridzation, then, is possible. It is a work of skill and patience, but is not impossible. I stated to you at Greenfield, that I suspected that Mr. Rogers had not succeeded in hybridizing, but that he had done exactly what I had done; that he had taken a seedling from the wild grape, and raised seedlings from that, which he supposed hybridized, and got, in the second generation, those successes, as I had got the Concord in the second generation from my experiments. That was the opinion expressed by Mr. Hovey, and the opinion entertained by eminent grape-growers throughout the whole length of the country. I supposed that to be true at that time. But I am perfectly sensible now, from long experience with Mr. Rogers' grapes, that he did hybridize the vine. It is much to his honor and to the credit of his skill that he has succeeded so largely and so well, that he has done the public such service.

Suppose you have hybridized, however, you have crossed your native, vigorous stock with a foreign stock, to obtain the fine quality of the foreign stock. But you do more than that; you infect the native vigor of the original vine with the delicacy of constitution of the foreign vine; and accordingly it happens that these hybrids, so far as my experience goes, without exception, require protection in the winter. Some of Mr. Rogers's hybrids are hardy without protection in some places; but I have not yet seen an instance, among all my acquaintance, where they have stayed out all winter without losing their wood. I have to cover them. They are fine grapes and are worth the trouble. But, as I have said before, in vineyard culture you cannot afford, where labor is so costly, to take them down by the acre and cover them up. I do not know but that it may be possible, in time, to raise a grape adapted to our climate out of the foreign stock, even; and I ought to say here, that a seedling from the Black Hamburg is growing in the open air in Belmont which has borne fruit as large and handsome, and, the originator thinks, as good as the Black Hamburg. He says he covers it carefully in winter, but it grows in the summer and ripens its fruit—late, to be sure, but still it does ripen it. I suggested to him that in a favorable season, when he got a perfectly ripened bunch and well ripened wood, that he should take the seeds and put them in the ground, and so continue to try to acclimatize the grape. Such a thing seems possible, though the process would be slow. I would prefer the other method of dealing with our native stock, which has the vigor and adaptation to the climate which are necessary for us in this rude North. I should prefer to ameliorate that by successive reproductions from seed.

Now, of the pulp which surrounds our native grape, I will say that, in my belief, it is nature's provision to secure the continuance of the species. It is a placenta-like substance, which nourishes the seeds when, at the end of our short season, the grape falls prematurely. My belief is strengthened by the fact that the Concord, grown at Jacksonville, Fla., as a friend there advises me, has no pulp at all, and is, to use his precise words, "of exquisite quality, and more agreeable to his palate than the Hamburgs which he grows." If so, then, when we shall have a grape early enough to ripen in the *heat of the season*, at a time when the climate is like that at Jacksonville, that may attain that quality here. If we can ripen the grape in August, we get rid of the pulp. That is no longer a problem. I have done it. I have grapes without a particle of pulp and of great delicacy of flavor which ripen in August, but I have not a late grape which does not have some pulp; and this year, which was cold and wet, the Concord had more pulp than I ever saw before. The pulp melts away, in other words, in those climates where the season is long enough to ripen it to perfection, and where nature is no longer put to the expedient of surrounding the seed with it to accomplish her purpose of reproduction. Now, if that be true, we have only to get at the right stock; and beginning with the earliest and best specimens possible, follow reproduction from that until we get a grape that will ripen in August. I think the prospect is full of encouragement. Man passes away, but plants remain; and when we have all passed away from this stage and this time, when so many are in doubt whether vineyards can yet be planted here to profit, our descendants will see this Massachusetts planted with vineyards, furnishing grapes of excellent quality and an abundance of wholesome wine.

Mr. Birnie. I see several gentlemen who can talk to us very sensibly on the subject of apples and pears. Some of us would like to hear something on that subject.

The Chairman. The subject is open. I think the members of the Board would like to hear from Mr. Clement.

Asa Clement, of Dracut. I do not know that I can say anything that will be interesting to any one. It was intimated to me that something might be expected from me, and I set myself at work thinking over the matter, to see if there was any branch of the subject, pertaining more particularly to apples, which I had not touched upon during the last three years, in some of the meetings of the Board. I could scarcely think of anything; and then, my experience during the last year has not been very encouraging. My apple crop has been the poorest I have had for several years. I had no new varieties which came into bearing, although I had grafted many, which I was hoping to introduce to the notice of the Board and others; but my hopes were blasted. Consequently, I have no new varieties to remark upon, nor have I tried any experiments during the last year which could throw any light upon the question of the cultivation of the apples or give any encouragement to any individual in relation to the raising of apples.

But I will remark upon one point which was touched upon by my friend Mr. Hyde, this morning, namely, this dry weather theory, as affecting the apple crop. I have heard it broached before. Gentlemen have said to me, that owing to the two dry seasons that we had in succession, the tissues of the wood were not sufficiently matured, and consequently the fruit buds were not in a state to bring forth fruit, although they would blossom. I thought, at first, that possibly there might be something in that; but I remembered distinctly that I had a row of Hubbardston trees, on the upper side of an orchard, which I planted some seventeen years ago, and on the dryest part of the whole ground, which gave me, last year, the best crop I ever had. There certainly had been no water carried there by any artificial means. I have no doubt the ground there suffered immensely, and the trees suffered, by the drought of the preceding year, yet they gave me this large crop. There was no extra cultivation. It is true, the land was cultivated twice or thrice during the season. I do not let the grass grow round the trees, and cultivate the ground to keep it in a tolerably loose condition about the trees, and all over the surface, that is all. Then in the same orchard there was one Minister tree, which I planted for experiment, and which had not failed, up to that time, to produce excellent crops in alternate years—it had not overborne, but just enough to have a good substantial crop, and they grew very large. Gentlemen who have been in the habit of attending our exhibitions for the last ten years will remember seeing some very large Minister apples which I exhibited on several occasions on the table here. In 1866, this Minister tree produced the largest crop it ever had. They were small apples, to be sure, but there was not room for them to grow. I went and pulled off a bushel when they were the size of walnuts, but I did not get off quarter enough. The crop, consequently, was almost a failure, because of the inferior size, and quality also. They were never so inferior in quality. Then I had other varieties which produced excellent crops. What I call the Russet Sweeting, for instance, known in some localities as the Cathead, in some as the Ladies' Sweeting; an apple resembling the New York Russet more than anything I know of, but sweet. It is an enormous bearer, and worth cultivating for the sake of feeding the apples to stock, if you could not sell them; but the last few years, I have had no difficulty in selling all I could raise. These cases seem to upset, in my mind, this dry weather theory, in relation to the destruction of the apple crop.

I must confess that I do not know, I cannot imagine, why the crop has been a failure. I have no idea of the cause. I have observed as closely as I could, and I have tried to find out, for my own gratification and for the benefit of others, if I could, but I have come to no conclusion in relation to the matter which is at all satisfactory to me, or can be to anybody else.

A MEMBER. Were not those trees shaded?

Mr. CLEMENT. They were pretty well shaded. The Hubbardston is a tree which is inclined to spread, not an upright grower, like the Northern Spy, but it branches low, and inclines downward. The branches of the tree shade its own roots to a considerable extent, more so, perhaps, than some other varieties; but I should not think that was enough to make any material difference; I should not judge it would.

Mr. Hyde suggested that the apple required, perhaps, more moisture than the pear. That may be true. It is possible that it does require more moisture, but still, I am not able to say that distinctly. It is pretty well known that the apple strikes its roots near the surface. It does not penetrate the earth so deeply as the pear. I believe everybody who has had any experience will acknowledge that as a fact. Consequently, in a dry time, the roots of the apple tree must necessarily be very much sooner affected than the roots of the pear. This very Hubbardston tree to which I have alluded belongs to a variety whose roots almost always strike out very near the surface. I think I alluded last year, at Salem, to the difference in rooting of different trees, and stated that I had noticed this difference in the nursery, when I have been growing trees. When the trees have been growing three or four years, I find there is a vast difference in the roots. The roots of the Blue Pearmain, for instance, strike downward, and root strongly. Sometimes it is rather difficult to get it up with good roots. That is my experience. The Hubbardston may be in the next row, in soil just precisely the same, as near as you could imagine, will spread its roots on the surface, and be vastly better rooted for the purpose of removal. I do not know how to account for that difference. But there is an analogy in the growth of the head also. That is another thing that I have observed. Sometimes I find a tree inclined to stretch upward, and not to branch properly, so that I have to cut it in order to make it form a symmetrical head. I find very frequently, almost invariably, that these trees have roots corresponding with the top. I do not know why it is so, but I know it is so, in a great many instances; but you will find that trees which spread their heads and incline to branch, are trees which incline to throw out their roots horizontally, and which are easily lifted from the nursery.

In regard to insects, I will say that the curculio is about as troublesome to apples, sometimes, as to anything else. I know they often damage the crop very materially. Quite frequently you will see the ground covered with apples fallen prematurely, when they are the size of cranberries or a little larger. They contain the worm which contains the embryo curculio, which becomes a perfect insect pretty soon after the fruit falls. I remember making some observations upon that point not many years ago, with regard to some Washington plums. They got very nearly grown, but still continued to drop until the crop was gone. They were pretty large, and I knew the embryo insects would have time to mature in them before they would shrivel up, and I put a few of them on a little clean sand and covered it with pots. At the end of ten days I looked at them very carefully, and found the curculios in various stages of development. Some of them had begun to go through with the transformation; on some we could see the legs starting out; on others the wings, but they were white. Others had got so nearly matured that they had got a sort of grizzly complexion, and were nearly ready to fly. Now I have no doubt that the first ones that go to seed, (if I may express it in that way,) are ready to go into the trees and do mischief as a second crop. I do not know how many they will breed during a season.

Then there is another thing which I have tried to learn—and that is where the curculios are during the autumn and winter. I have not been able to satisfy myself where they are. They are evidently somewhere, because we can shake them from the trees and secure them just as soon as they can get a plum to taste—before the blossom is off the skin. Then I have observed that they seldom deposit their egg until the plums get a little larger size. They begin to work upon them, cutting and slashing round; but I have never seen them sealed up until they got to be of a larger size.

In regard to borers, I remember that I went into that subject at a previous meeting, and recommended the protection of a class of birds, various woodpeckers, which I know feed upon the larvæ of these insects. I have frequently seen where the woodpeckers have taken out the borers; and as they destroy no berries or other fruit, but are entirely carniverous, if I may use the term, I think it is well to protect them. With respect to some other birds, my sentiments have been somewhat modified; but of that I do not wish to speak at present, perhaps not at all.

I do not think of anything more in relation to the apple which can be of interest to any one; but if any gentleman has any question to ask, I will try to answer it.

Mr. Birnie. Have you any remedy to suggest for the curculio?

Mr. Clement. Yes. It is one which will require considerable patience and perseverance. It is to pick up the fruit and destroy it by some means. Perhaps you may boil it for the pigs or throw it into the river. Get rid of it in some way. Let the children, or anybody who can attend to it, pick up the fruit which contains the worm, and which will eventually contain the curculio, and destroy them. This plan will not destroy them all, it is true, but it will diminish the number. I once had a plum orchard of some seventy-five trees that began to bear very nicely, and I raised them in spite of the curculio. I bought some cheap sheeting and made some large square sheets, with a split half way up in the middle, and went around twice or thrice a week, with the children; one of the sheets was held up round the trees, and I kicked the trunk with rubber boots, and jarred the curculio down and killed them at once. We could thin them out in that way. A little attention would save an abundant crop.

Mr. Birnie. What time of day would you recommend?

Mr. Clement. Almost any time except midday. This matter of fastening cotton round the trunk of a tree is all humbug.

The curculio flies as much as the bee does, or any other insect, and I think very few of them are ever tangled in cotton round the trunk of a tree. Possibly there may be one caught occasionally.

Mr. Birnie. Do you think they take refuge in the ground during the winter?

Mr. Clement. I believe it is the general impression that they do, but I have never been able to find them there. The curculio is a very cunning little insect, anyway. The moment that you frighten them in any way they coil themselves up and look like a minute dead body. You have to look closely to discover the difference. But they will soon scamper away. I am unable to say whether they burrow in the ground or are lodged round in crevices on the rough part of the tree, or in walls, where they can find shelter.

A Member. Do hens eat the curculio?

Mr. Clement. I have noticed that people have sometimes inclosed their plum trees in their hen yards, and have saved the fruit thereby. Whether it is in consequence of the hens eating the insects, or whether the insects themselves have an instinct which leads them away, I am unable to determine. I have observed this: that where plum trees hang over a brick wall or anything of such a nature that when the fruit falls the worm that comes from it cannot crawl into the earth, the curculio does not injure the fruit half so badly as in other places. Indeed, I have had crops escape that were hanging over a wall where there was nothing but a pile of boards put up, and then a temporary roofing put over them by laying short pieces down and then battening the boards up, to shut off the rain partially. My impression is, that the insect has an instinct which teaches it that that is an unsafe place to deposit its eggs, where the fruit is going to fall upon any substance where it cannot be sheltered. I do not know how that may be.

I did intend to touch upon peaches briefly, for the reason that peach trees have nearly all failed in Massachusetts. There are but very few in the State, and I think none, six or seven years old, which are in a perfectly healthy condition. My experience has been, that after peach trees have been bearing a few years, or even if they are young and vigorous, if there comes a very severe winter, it almost freezes the vitality out of them. They sometimes live along and bear a few peaches, but you will find that they are brittle, a little touch will snap them, and you will observe that the heart is all dead; there is just a thin skin round the surface—the rest appears to be dead. I think that the bulk of the peach trees in this city are in that condition.

Now, peach trees fruited pretty well last year—what there were of them—in the vicinity of Lowell, and in other localities. The trees bore pretty well, produced good specimens of fruit, which brought a good price. I have some neighbors and acquaintances in the town of Tyngsborough, who had an excellent crop and obtained a very high price for them. Other neighbors in Pelham and Hudson were in the like condition. The demand for peach trees last spring was considerable, and many wanted to plant who could not obtain them. If the fruit-buds are not winter killed the present winter, but come out all bright next spring, the demand for trees will be great—you may rest assured of that. I have noticed this for twenty years —that if the peach crop is a failure, the next year there will be little demand for trees, and if there is a good bearing year, there will be a great demand the next season. It is so in a measure, with regard to the apple, although that is not so fluctuating. I find it takes but little to discourage us with regard to any enterprise. It is just so with the grape. A nurseryman came to my nursery last fall, who did not have so many grape-vines as he wanted, and told me one of his neighbors was going to set out some, and he wanted 500 for him, and thought he should want 500 for retailing. I showed him round, and told him, "There are three thousand Concords, two years old, and you may have them thus and so." He told me to write him when we got ready to lift them, in October, and I did so. In a day or two, I got a reply, saying that grapes were so bad, that the man had abandoned his plan entirely, and was not going to have any. It is remarkable that such things do discourage men. I have not lost my crop of grapes for ten years. No other crop has done so well; no other crop is so sure, unless it is the currant, and that I do not consider of any consequence. This year my grapes were a total failure—not worth gathering. I might have made vinegar, I suppose, but I had plenty to do, and I let them rot on the ground. It seems to me folly for persons to get discouraged in relation to any crop of fruit, because there is an occasional failure. I expect it of any and all my crops. I never expect to get a crop of everything I plant, in every year. We are not so wonderfully favored as that, and I am not sure that it would be the best thing that could take place for us; at any rate, I never look for it. Of course, when I plant the seed, I expect a crop, but I expect an occasional failure. We cannot tell whether our buckwheat will fail or not. We may sow it early, and it may blight badly. Our rye may blast or rust. We cannot tell about these things; we can only plant the seed, and hope for the best. If we do not succeed in everything, I do not think it is best to feel the disappointment heavily; I do not think it is best to lay it to heart, or let it bear us down, give us the blues, or do anything else which shall disturb our equanimity.

A MEMBER. Can you give us any remedy for the difficulty with peaches?

MR. CLEMENT. I do not think anybody can give any remedy, by which we can save all the peaches. I remember when at the exhibition, at Framingham, a year ago last autumn, I saw only one plate of peaches on the table, and they were raised in Middlesex County. I asked the gentleman who raised them how it happened, and he said he had a tree one of the branches of which lay along almost horizontal, very near the ground, and in the autumn he threw a load of corn shucks all over it, and hence the fruit buds were not killed. When spring came, he uncovered it, and that one branch bore a fine crop of peaches. I say it is possible, practicable and feasible to so train these trees, by beginning early, that the branches may be protected in that way during winter, and a good crop secured.

MR. HYDE. What do you think of cultivating them in pots, and taking them in?

MR. CLEMENT. I think it is safe, but it is, of course, a little more expensive. Still, it is worth trying. A peach is regarded as a great luxury, and if by planting a dozen trees in tubs or pots—any cheap article—so that they can be taken in in winter, and placed where they shall not be injured by our severe seasons, we can secure a crop, I think it would be better to have them. My experience is, that a little freezing will not hurt them, but I am not sure of that. I know peaches are raised in that way. I have seen them on the tables of the

Massachusetts Horticultural Society, and it is a very beautiful sight; exceedingly ornamental. A little tree, the size of a whip-stock, three feet high, trained symmetrically and handsomely, with four or five dozens of early Crawfords upon it, looks beautifully. I do not know why people who raise things for ornament should not go in for peaches as well as everything else. They certainly would be ornamental.

Mr. Hyde. Why not profitable?

Mr. Clement. I have no doubt they would be, to raise for the Boston market, where they pay such high prices. I learn that some of the fairest peaches sell for a dollar apiece.

Mr. Hyde. Three dollars.

Mr. Clement. Three dollars? Well, I believe they could afford to grow at that price. I suppose there are some people, probably enough to take all we can raise at present, who are ready to pay these high prices. I know there are men who have to contrive ways and means of spending their income, and it is fortunate for us poor people that there are such.

I think our friend Mr. Hyde alluded to mulching grape-vines with bristles from a brush factory. I hardly approve of mulching grape-vines under any circumstances; there may be exceptions. Of course, if you mulch a grape-vine with bristles or leaves or rubbish of any sort, you shade the ground; it will be a little cooler, it will be more moist, of course; it will attract the roots up there, so that you cannot cultivate the ground without taking off certainly many thousand fibres; and I like to have the sun shine upon the soil round a grape-vine.

Mr. Hyde. That was only an experiment.

Mr. Clement. It was very well to try it, but you would not recommend it after trying it?

Mr. Hyde. No, sir.

Mr. Clement. I should not recommend mulching grape-vines, except perhaps under some peculiar circumstances. Where the roots come very near the surface, and there is great danger of drought, perhaps an occasional mulching might preserve the vine.

The matter of pruning grape-vines has been alluded to, and I had intended to say a word in relation to it. I wrote to Mr. Bull a year or two ago, and told him that the remarks he had made at one of our meetings—I do not remember now where—

more nearly concurred with my views than those of any other gentleman I had heard speak upon the subject. I do not believe that this eternal pinching and nipping and cutting and slashing is any benefit at all to our rampant-growing vines like the Concord and the Hartford. I have tried some experiments for the purpose of testing that matter. Two years ago I had a row of Concords, each vine tied to a single post—no trellis, no rails, no wires, but each vine was simply tied up to a single post. They were equidistant, and so far apart that I could prune any one in such a way as I pleased, and leave another. I intended to try an experiment with that row, and I continued last year, as I had done the year previously, to pinch every alternate vine about the time the blow showed, leaving the others to take their own course. They were late about starting. I remember that it was not until about the Fourth of July that the grapes began to show. It was late, but still they looked healthy, and started fairly, with large clusters, as I thought. But the frequent rains we had, followed by a scorching sun, affected the leaves badly. They seemed to be water-soaked and tender, and the sun seemed to scorch and crumple them up, and they began to drop off pretty soon, and before the grapes were nearly grown some of the foliage began to drop, so that my experiment was entirely broken up. About the tenth of July I went to look at the vines, and found they had begun to mildew in the bunch ; not every vine nor every bunch, but a large share of them were mildewed ; they looked mouldy, and they were so far gone, and so large a proportion were affected, that I thought it would be useless to attempt to check it. I found it did not spread any more, and it is my impression that it was all done in a day or two—about the time that Mr. Hyde described this morning, when we had those sudden changes from dry to wet and from heat to cold ; three or four in the course of twenty-four or thirty-six hours. It was all done during that time. And it stopped almost as suddenly as it came. It was pretty general, also. There were scarcely any vines that escaped except those which we regard as worthless, like the Clinton, (which retained its foliage until it froze up in October,) the Early Strawberry, (which is another of those wild natives,) and one or two others, which I do not think of propagating now ; but I have one or two vines of these varieties upon the place, and keep them there, because they have been bearing for a number of years, and I dislike to cut them up. I can sell them for making jelly, and I am about as sure of them as Mr. Hyde was of his wild vine; and sometimes I think them about as profitable as anything on that account.

I should recommend, most certainly, if any one was planting a vineyard, whether large or small, the selection of dry, warm soil, and a location not liable to frost. Take a side hill, with a southern slope—no matter if it is dry. I have observed this fact—that a grape-vine will endure about as much dry weather as any plant in the world. It will grow in sand that is very dry, and hold its vigor and its green foliage, and not wilt during the middle of the day when the sun plays down upon it. Hence I would recommend the selection of warm, dry soil. Do not make it too rich with manure. I think that land which will carry a good substantial crop of corn is rich enough for a crop of grapes.

Mr. Brown. I want to say a word or two about peach trees. That interests me, because I think the peach is the best fruit that grows in this country, and I believe that it is considered the best fruit grown in New England, by common consent; and it grieves me sorely that we cannot raise it abundantly in this State. However, I feel impressed with the conviction that we shall have a plentiful crop of peaches again. I have tried various ways of raising them. I have raised them in pots, and am doing it still. Very fine peaches can be raised in that way, but they require greater care than a common farmer, who is engrossed by his everyday duties about his farm, can bestow upon them. That the climate is not suitable for them we must all agree. Most of us get peaches, almost every year, from branches that lie on the ground and are covered with snow. Therefore the tree needs protection. Now how shall we get that protection? A farmer living in the town of Acton, three miles from here, in 1855 received $350 net from two hundred peach trees on one acre of land. The trees were placed in a young apple orchard, between the apple trees, on land that is high, very stony and gravelly. Last year the crop was very light indeed. This year his peaches netted him $400. One entire horseload that he took to town brought him nine dollars a bushel. I was up in New Hampshire in July and went into a peach orchard of eight hundred trees. The trees were about twenty feet apart each way, and there was not a tree in the whole eight hundred, as the man told me—and I went through the orchard in every direction and think he was correct—that did not have some peaches on it, and most of them had a great many. As he went along he would pull them off and throw them on the ground, without paying much attention where he took them from. Said I, " What makes this success ? I do not understand it. Here you are thirty miles north of where I live, and you frequently get good crops of peaches. How is it ? " Said he, " That is the question almost everybody asks me when they come into this orchard. I can see only one thing ; " and he pointed to the mulching which I saw round those trees. They were about eight feet high, and so level that you could look across the tops of the trees. They were almost as level as a floor, he takes such pains to head them in. The branches were eighteen inches long, but the peaches were up next to the stem of the tree. He cuts out the middle shoot, and lets the two side shoots go ahead. He keeps the whole tree headed in, and the top twigs come down within eight inches of the ground. I have not heard from him since, as to how the crop came out, but it looked then as if it would be very good.

This discussion has taken a very wide range, and we have had a great many pleasant theories and statements that are interesting and worthy of remembrance by all of us who mean to engage in the cultivation of fruit. But it seems to me what we want is some facts to show how we can obtain fruit under present circumstances. Is it possible for us to obtain fruit, even though circumstances are against us as much as they are here. I believe it is. Nature is very prolific indeed. The first effort of the vegetable kingdom seems to be to propagate itself. So it is with the animal kingdom. A single plant will produce enough to seed a whole acre. So you see what efforts nature makes to be sure the plant shall not go out of existence. The moment we prune a tree, we make an artificial thing ; it is no longer a natural thing. Then it comes under the care of man, and he must deal with it in a manner entirely different from the way in which he would deal with a tree in its natural condition. What shall we do when we have an apple tree ? The apple tree grows profusely ; it fills up its head, if we leave it a few years. Then we head it in. So with the grape. It grows in the most rampant manner. We head it in, choke it. What else shall we do? When the fruit is set, you will find that it is impossible for the plant to perfect all of it. Then the next thing is, to go to work and thin out in the most liberal manner. Go to your grape-vine and reduce the number of bunches from one-half to three-quarters, and you will have grapes; I have no doubt of it whatever. So it is with pears. Let them remain as they set, and you have very rarely perfect fruit. They will not attain to their full size and flavor unless you relieve the tree of the burden that it has imposed upon itself. I think these are plain, practical, simple rules, which we can all adopt, and by following them, we can get fruit, even under all these disadvantageous circumstances.

Then, one word more. The common opinion is, that people cannot raise fruit under glass without great cost and care. I think that is a mistake. I do not think there is a farmer who has the skill to manage ordinary carpenter's tools who cannot put up a structure in which to raise Black Hamburgs at very little cost. The common expense has been ten dollars a running foot. There is no need of it. Go to work and lay out your ground; set standard posts that will be lasting, put in your sills and build your building with common unplaned boards, let them come together without matching, but close as they will in the state in which they come from the mill. Then you may nail laths across these boards, which will prevent currents of air from passing through. You have then got your outside. Then put on your roofing. There is no necessity that it should all be glass; the lower part may be all boarded. In that case, you would insert pretty large panes, which would be just as cheap in the long run, unless you broke one. There you have your building, which will answer all the purposes of a cold grapery. I think you can raise your Black Hamburgs there profusely, and scarcely ever fail of a crop, when you would be likely to fail in out-door culture. Why not try it? There is no better grape, take it all in all, than the Black Hamburg. The only drawback is in thinning it. When the berries are about the size of pease, then you must thin it, or you will utterly fail in your object. It is futile to think of getting a crop unless you thin it; say, if there are five berries, take out three. That is the only difficult operation in the whole thing. That is a hard and painful job. It requires a slender pair of tweezers, because the bunches ought not to be bruised in the slightest degree. When you have done that, water your plants until about the first of June, and that is about all the work there is to be done. When it gets to be about the first of November, and the leaves are falling from the vine, then trim them, which is a simple thing. Cut off close the stems which bore fruit this year, and leave every other. Then paint them over with a paint made of soap and sulphur, lay them down, and cover them up with pine boughs. In that way you raise the best grapes in the country, at very little expense. You can raise peaches and grapes, if you will only assist nature a little in her efforts.

James Thompson, of Nantucket. I will say a single word in confirmation of what the last speaker has said with reference to peaches. In the garden of the house next to mine, a peach tree came up, close to the house, blossomed and bore fruit once, and never bore any more. The old lady who is there alone in the house, shut a blind back against one of the branches, and it grew up behind the blind. It was not disturbed until the first of October, and then, when she shut the blind, that branch was found to be literally loaded with ripe fruit, as big as my fist, and delicious in quality. There was not a peach to be seen on any other part of the tree.

A Member. I want to ask one question of a practical nature. Allusion has been made to the raising of peach trees in pots, to be sheltered in winter. I want to inquire what sort of shelter is necessary. Will sheltering these pots in a barn answer the purpose, or must they be carried into the cellar ?

Mr. Brown. I put mine in the barn cellar, where I keep my farming implements. Last spring, you never beheld a more beautiful sight than those peach trees were. They were as beautiful a bouquet as you ever saw in your life. I told the man to take them out at once, but unfortunately there came a nipping frost, which nearly ruined them all, for fruit.

A Member. I have no doubt they would be sufficiently protected in the cellar, but what I ask is, would it answer to put them on the barn floor ?

Mr. Brown. I do not think it would. They need an even temperature.

A Member. The simple inquiry is, the degree of protection that is needed; because, if the ordinary shelter of a barn or shed is sufficient, we can cultivate them easily; but if they have got to be carried into the cellar, where we have but little room, it would be a great deal of trouble.

Mr. Manning. In Washington, I was told by Mr. Sanborn, that the only protection given to his peaches was by placing them under a shed.

Mr. Clement. Mr. Wilson's peach orchard, in Jersey, is on very high land; it is my impression that there are mountains on the north and west from his orchard. It is not long since he had quite a large peach orchard; there came a cold spell one winter, when the ground was naked, and killed a large share of the trees at the root. I presume the root will not bear so many degrees of cold as the top will. They are quite sure to freeze to death if the mercury runs down to ten or fifteen degrees below zero, when the ground is naked. Once, Mr. Wilson mulched his trees, partly for the purpose of preventing freezing, and partly to save cultivation. Peach trees should be always on high ground—always. It is no sort of use to plant them in a valley.

PLOUGHING.

The question of Ploughing was then taken up, Mr. J. M. Smith, of Sunderland, occupying the chair. The Chairman opened the discussion as follows:—

The subject of ploughing is an important branch of farming, and there has been, during my day, a diversity of opinion in regard to it. There are advocates of very deep ploughing, and deep ploughing, and others who advocate shallow ploughing, and there are also advocates of subsoil ploughing. It seems to me that there is room and opportunity for discussion and argument on either side. I have been inclined to the opinion that the advocacy of deep ploughing may have been carried too far by some individuals. It has been my experience, that unless heavy land, clayey land, is thoroughly drained, it is of no use to plough deep; but on land which is dryer and in a high state of cultivation, deep ploughing may be beneficial. I have, in my own short experience, come to the conclusion that I have ploughed too deep, and I do not plough so deep as I did ten years ago.

I will throw out another idea, because I presume it will promote discussion. My land was alluvial and rather dry, and I know I have injured it by subsoiling. What is the proper depth of ploughing, then, is the question that would arise, and what are the benefits of subsoiling? I have heard my father tell how shallow a piece of land he owned was ploughed at one time, on which he planted Indian corn. It was turf land, and it was so shallow ploughed that but little loose dirt could be made, and the harrow went waupety-waupety, as we say. The result was a very heavy piece of Indian corn. I am inclined to believe from that, and from my own experience, that we ought not to plough very deeply for Indian corn as for some other crops.

I simply make these remarks to present some leading points of discussion. There is opportunity now for any gentleman to present his views.

Mr. BIRNIE. You say a piece of land was injured by subsoiling. What was the character of that land?

Mr. SMITH. I stated it was alluvial. It was clover land, and had been mown one season. I intended it for wheat. It was our common meadow land on Connecticut River. I ploughed it, and followed it with the subsoil plough, and the result was, it took several years and many loads of manure to bring that part of the land—one-half the piece—back into as good a state of cultivation as the other half, and into good crops.

Mr. BIRNIE. I do not understand still. Did you turn up the subsoil?

Mr. SMITH. No, sir, only to the bottom of the furrow.

Mr. BIRNIE. With a mould plough?

Mr. SMITH. Yes, sir. I have subsoiled on other pieces of land which were fallow, without any apparent result whatever.

Mr. BIRNIE. It was damaged by loosening the soil some inches below the furrow?

Mr. SMITH. That was all.

Mr. HUBBARD. That brings to my mind a remark that I made to a man that I hired. The first job I set him to do was to plough a certain field. I told him where to go, and he went out and ploughed the field, and I found he had ploughed it very deep—deeper than I had been in the habit of ploughing.

I was very much incensed, and told him that his first day's work had nearly ruined the field. The result was, I never had a better crop than I had that year.

We plough for two purposes. We plough to save a great deal of labor through the latter part of the year, in the first place. When the land is not properly ploughed during the early part of the year, of course there is a great amount of labor to be expended upon it during the season, to get it properly cultivated. There has been a great demand for improvement in ploughs, in order that the ground may be properly ploughed. I can recollect, that in ploughing green sward, with the old-fashioned plough, we had a vast amount of labor to do afterwards in order to cultivate the field, because it could not be properly turned over. But with the modern improvements, we can turn over our green sward in such a manner, that, so far as my experience goes, that kind of land requires less cultivation than any other. But one question that will arise in the minds of individuals is, at what time in the year is it most beneficial to plough the land. There is a diversity of opinion in regard to this. I have heard individuals say that they would not have land ploughed in the fall, for the reason, that when the ground is not covered with snow, a great deal of the soil is blown off. Now, I have found, in my experience, in the cultivation of certain crops, that the fall is the best time to plough the ground, especially if I put my manure on and plough it in; and for this reason: that if the manure is put on in the fall of the year, and the ground ploughed, I can work it much earlier in the spring. I think all will concede the fact, that the land, if it is heavy, clayey soil, can be worked much earlier in the spring by putting the manure on and ploughing it in in the fall. For raising cabbages, turnips and such crops, I have for several years adopted the plan of putting on the manure in the fall. I do not care how soon it is put on, after the crop is taken off. Spread it on and plough it in; and so far as my experience goes, I have got a better crop in that way than by allowing the land to remain until spring, and then putting the manure on and ploughing it in.

So far as ploughing for a crop is concerned, when we turn over green sward, for a crop, it is a question with many as to which is the better time to plough, in the fall or in the spring.

So far as my experience goes, I would rather plough it as late as I can in the spring. If I am going to raise a crop of potatoes, I let the land lie until I am nearly ready to plant. Then the grass roots get a little start, and if it is well turned over, I find less work in cultivating it, and I think I get a better crop than by ploughing at any other time of the year. That is because I do not break the turf. The land which I plough in the fall is land which I wish to cultivate by completely pulverizing the ground. I do not think there is any danger of our ploughing too much. We are in the habit, many of us, of ploughing only once, in the raising of our smaller grains, and formerly, I used to plough only once, but I now invariably plough twice. Ploughing the first time as early as I can, harrow the ground over, let it lie until it is in a suitable condition to put in the seed, and then plough the second time. There is one crop, wheat, that I think should be put in early, whether the ground is in good condition or not. If it is in condition so that we can possibly work it, I think the testimony of almost every individual is, that it is better to put in the wheat crop early. But that is a crop that is not raised to a very great extent. The question has been mooted here, whether we can raise it in Massachusetts. I think we can raise it in Massachusetts just as well as they can in other parts. As I have said, if we will give a little attention to it, and each farmer put in from one to three acres, we shall save a great amount of money that is expended for breadstuffs brought from the West. I hope and trust, that we shall give more attention to that subject than we have, and make the trial, and see if we cannot do more in the matter of raising wheat than we have heretofore.

Mr. Clement. In connection with this matter of ploughing and subsoiling, I would like to remark, that some years ago one of my neighbors had a subsoil plough, and I thought I would try it on my own ground. I was then working a piece of sandy soil, and I subsoiled it as deep as I could. I saw no beneficial results arising from that, and I do not know that it could reasonably be expected from land of that character.

As has been previously remarked, I do not believe in ploughing heavy soil very deeply. I think, if you plough heavy soil deeply, and bury your manure deeply, and then plant corn upon the surface, you will scarcely perceive any benefit at all from it, and you will lose the manure at the same time. I have tried planting corn on heavy soil, on a small scale, for use in the family. I did last year. Well, I had occasion to work that ground over, after taking the crop off, and I found that scarcely any of the roots penetrated three inches deep. You cannot make corn roots run down into cold soil; it is not natural. I believe the corn will starve to death before it will go down any depth in search of food. Therefore I would not plough deeply at all on cold, undrained soil. My soil being of this rocky, sandy, character, I do not believe I could derive any benefit from subsoiling. I have no soil where there is clay. I do not know that there is a ton of clay on my ground anywhere; I do not think there is. I am sorry there is not; I should like it much if I had some clay that I could use on my sandy soil to improve it mechanically, and make it more retentive of moisture, and enable it to hold manures better. But there I am. Hence I have never used the subsoil plough but little, and those experiments which I made did not prove satisfactory, and I gave it up; and the gentleman of whom I borrowed this plough has never used it much. I think it has lain in his tool-house some twelve years, and has not been used much, and probably never will be again. His soil is very much like mine.

I can see, that where a gentleman has a stiff, clayey subsoil, and not many rocks in it, so that he can put on a team and break up this hard substance beneath the surface, it will be an advantage; but I cannot see that it will be any advantage to an ordinary soil, where there is none of this stiffness of subsoil.

Mr. Birnie. When I first began to farm it, I had an idea that deep ploughing was everything, and I made up my mind to put the plough right in; but I confess I have modified my opinions very much by experience. I do not plough now over six inches deep. I am satisfied that the roots of the crops we cultivate come pretty near the surface. I want my manure just as near the surface as possible, and have it mix with the soil, after harrowing it or ploughing it in. I think, if you put manure on the surface and plough it in deep, it will never get to the crop. I have been most successful by putting the manure on the surface and ploughing it in very lightly. I have a subsoil plough that I used years ago, but I use it very seldom now, except for my root crops. I find it an excellent implement to be used in that connection. I find that the mangold wurzel does not go very deep into the ground, and I do not plough over six inches deep for mangolds; but after the land is marked out, I run my subsoil plough where I intend to plant my seed, and it loosens the ground. I run it between the rows, and I find it loosens up the soil very finely. That is the only use I make of the subsoil plough.

In relation to the season of ploughing, I like to plough in the fall, because it helps along the spring work.

A MEMBER. How deep do you run the subsoil plough?

MR. BIRNIE. I run it down to the bottom of the furrow—no deeper. It seems to raise the ground up—soften it. I turn over the ground just as early in the autumn as I can. If I cannot turn it over early, I prefer to let it lie until the next season and plough it as late as I can, when the grass has started. I prefer to get just as much growth to the roots of the grass as I can before it is turned over. I put oats in the ground as early as possible. I raise several acres of oats every year. I plough in the autumn, and then sow before the ground is dry enough to plough in the spring.

THOMAS W. WARD, of Shrewsbury. There are but very few farms in my neighborhood, that have cultivated fields upon them, that do not have more or less small stones—cobble stones—and they are a very great nuisance to the cultivator. Where fields were ploughed as our forefathers ploughed them, they became pretty much clear of these stones, so far as my observation has gone. That was the case on the farm where I lived, and our fields were generally in a very good condition, so far as these stones were concerned. I am on a farm that was cultivated by my father, and before him by his father, and it was owned by his father; I am the fourth generation on the farm, and I well remember that in my father's lifetime he ploughed when it was convenient for him to plough. If it was convenient to plough in the fall, he would plough then; if more convenient in the spring, he would plough then; but he always ploughed. He didn't put his plough in very deep. He never wanted his grass land ploughed more than from four to five inches deep, and I do not know that he ever failed to get good crops—good crops of corn, and good crops of grass following the corn. Now the grass crop is a very important crop to all farmers; it is one they look at more than they do at the corn crop. We are all aware that grass does not root very deep, and, as has been remarked, corn does not root very deep. I think it does not root so deep as the potato. If I was going to plough deep for either crop, it would be for the potato. When I took the management of the farm, which was after my father's decease, the word among farmers was, "plough deep." Older men than myself said that; it was a story of their telling, and without their experience I thought it might do for me to follow their counsel, and I put in the plough deep. I did not stop at five, six or seven inches. Now what was the result? That ground had been cultivated year after year continually, and probably had not been ploughed more than five inches deep, and all the goodness that had been carried there, except what had been carried off in the crops, was near the surface; and when I put in the plough deep I turned that all under out of the way. What sort of a crop could I get from that subsoil? Where I ploughed in that way it spoiled my field for years. The next time I had to plough deep, so as to turn up what I had ploughed down; then I was pretty careful not to plough deep after that, but let my manure lie on the surface, and then I got good crops again. But that is not the end of it. In ploughing to this depth, I not only turned down to a considerable depth what was on top, but I turned up a great many cobble stones. I lost my crop by ploughing deep, and also made myself labor by turning up stones. Now where was the advantage? I consider that I sustained a very severe loss in that manner of ploughing. Since then I have not usually cared to exceed five inches, and get my manure worked in at that.

I have ploughed in the fall. I think much depends upon the ground you are to plough whether it is possible to plough in the fall. If you have a tough, hard piece of ground that you desire to break up, it is better to plough in the fall; the frost has considerable effect upon the hard soil, and I do not think there is any very great loss by the wind blowing off the surface soil. It will take away some, unless the ground is covered by snow, but I think the loss is not to be compared with the gain that you make in letting the frost operate in pulverizing it. I think there is great gain there. I think a light soil may as well be ploughed in the spring as in the fall, and I think it is quite as good for the crop, especially if you are going to put in corn. I think the corn crop is quite as good upon a piece of ground turned over twice in the spring, as it will be upon a piece of ground turned over in the fall. But there is a great deal of advantage in fall ploughing. Our teams are generally then in full strength, and in much better condition to do this work than in the spring, when the warm weather is coming on. They have been in the barn all winter, and when you take them out to exercise them, it takes them a good while to get the use of their limbs and recover their wasted strength, and they feel this work much more in the spring than in the fall. Therefore, I think fall ploughing, where it can be done, is very much better than to let it alone until spring.

Mr. Thompson. I called up this subject to learn instead of to teach. When I was a boy, I carried on farming, and worked at it until I was seventeen years old, but it is but recently—within three or four years—that I have commenced handling the plough again, and I do not mean to handle it much myself now, but I like to know the best way that it should be handled, and the best season of the year to handle it, because it is the duty of the man who either holds or drives, to know all the minutiæ of ploughing.

In my younger days, we ploughed, usually, quite early, and with the best ploughs we could get in those days, and along through my later life, up to within three or four years, I have read a great deal on ploughing, from every source that I could, and it has been "deep ploughing," it has been "top dressing," and it has been "get the manure down as deep as you can; no fear but that it will come to the surface." Now, it comes to about this: Every man should seek to know the capacities of his soil, and the requirements of the crop which he intends to put upon the piece of ground which he ploughs. My experience has been, in the last three years—and everything I do is a sort of experiment, because I look at the result of everything I do—the result of my observation and experience is, that if you have a pretty tough piece of land, your team, as the gentleman who spoke last said, is in good condition to turn over that tough piece of land in the fall, and I would turn it over as deep as six inches. Of course, on your tough piece of land, the soil is a little deeper than it is on a light piece of land; therefore, I would turn it six inches, and I am now working upon that principle. After the land is turned, and through the winter, the manure is to be applied to it, and there it lies, until the spring comes round, about the time when I want to plant the crops; then I usually turn the manure under three of four inches. That is, for my root crops, for spring wheat, for barley, and such crops, I should put the manure on in that way. We generally put our corn upon quite light land, because sandy land is worked much better than heavier lands, and the corn crop will do better there.

Now, this subject leads us to inquire what plough we had rather use. We must have a plough to plough with. I have tried a great number of ploughs, and I have watched the different ploughing exhibitions throughout the State for the last five years pretty carefully, to see the kinds of plough used, the manner of ploughing; and I have always noticed that a plough with a short mould-board, if the mould-board was very concave, and the land stiff and hard, would throw the top edge of the sward off before it was ready to leave the convexity of the mould-board. It will roll along, leaving a place where a horse would break his leg if he undertook to go crosswise of the piece, if he put his foot down into that deep hole. I saw the ploughs at the exhibition here this fall, and the Michigan seemed to work better than some others on hard soil; but our lands are light, sandy loams, and the Michigan would be of no use. If you put two or three inches of the surface down seven inches, you would never hear of it again. You have got to wait until you can make some new soil above before you can get a crop. Therefore, I do not like that. There was the Morse plough, which seemed to be just convex enough. From the time it lifted the sod, it continued to give it a regular curve until it turned bottom up. I obtained one, and tried it in competition with the Doe plough and the Universal plough. There were over twenty men in a lot where the sward had not been turned for the last six years, and the last time, or the time before the last that it was cultivated, it raised sixty-five or sixty-seven bushels of shelled corn to the acre, and it would cut three tons of hay to the acre. You can see that that must have been good soil, and therefore the sward quite deep, and full of twitch-grass. I had two horses, one four and a half years old.

I put that pair of horses on the ploughs alternately, and tested the ease of draft and the best turned furrow. I found my team would go twenty per cent. easier with the convex mould-board on the Morse plough than with either of the others, and turn just such a furrow as I wanted—wide enough at the bottom to enable any horse or ox to walk easily and freely. Down our way, we have an abundance of sea-weed, and we sometimes enrich our land by filling the whole furrow full. As the team goes along, two or three men can follow it and put in sea-weed enough to fill it full, and turn the next furrow on to it. I have seen land enriched in that way, so that it would bear any amount of crop that you had a mind to ask it to bear. Down in Fairhaven, I have seen very stony land reclaimed, with sea-weed. Therefore, we want a plough that will give a wide berth for the horse to travel in, in order to fill up with sea-weed. I would plough those lands about six inches deep usually. I would plough in the fall for root crops, and turn in the manure three or four inches in the spring. I should rather have it three than four—either with a cultivator or with a horse-hoe. Then, when you run your seed-sower, you have a well pulverized soil, and you have the manure in immediate contact with the seed, to give it a vigorous start, and your seed has an opportunity to come along in time to enable you to thin the plants and weed, before the weeds become so strong as to interfere with them.

M. F. WATKINS, of Hinsdale. I would inquire if the depth the furrow should not vary according to the soil?

Mr. WARD. I believe I stated that in deep, heavy soil I would plough deeper than in light soil. It depends altogether, I think, or very much, on the nature of the soil whether your ploughing ought to be deep or shallow, or whether you should plough in the fall or spring.

A. P. SLADE, of Somerset. I feel interested in this subject, because I lost a crop of corn last year in consequence of making a mistake about ploughing. I will simply tell how it was done. I manured a piece of stubble ground very liberally, thinking I would produce a piece of corn that should be entitled to a premium, without letting any one know about it until I had raised it. I applied any quantity of the best manure. The land was ploughed in the fall. I sent my man to plough in the manure, and he asked me how deep he should plough it. I told him just deep enough to cover the manure handsomely. I was very busy, but after a while I went to see how he was getting along, and found he was ploughing it just about eight inches deep. I planted the corn with poudrette in the hill. It came up very handsomely, and grew until the poudrette was exhausted, and then plodded along, as we might say, through the season. It never amounted to anything. I think I can account for it, for after I had made up my mind that my crop was lost, I studied into the matter. Knowing that it was a very wet season, I supposed that the roots of the corn had not penetrated the soil as deep as the manure was put. On examination, in company with a gentleman who was visiting me at the time, I found that the corn roots ran almost on the surface of the ground, and that it was a rare thing to find the fibres extending down more than two inches. This was rather an exception to the usual growth of corn roots, for I have known them to run down nine inches, and have known a heavy crop of corn raised where the manure was ploughed in nine inches deep; but owing to the character of the season, it being so very wet, the roots were encouraged to follow the surface, and the manure that I put on to get that crop of corn was lost. But I am in hopes to get a good crop of potatoes there another year.

I will just mention another incident that occurred last year. I purchased a new plough last spring, just as Mr. Thompson did. I used a conical plough, and when we were ploughing our onion bed, the plough was running so nicely that we ploughed it ten inches deep, where we usually plough only eight. It put in the manure very handsomely, but it turned up on the surface a sort of lifeless earth, that of course was a stranger there and never should have been brought there. And just to show that a certain theory in relation to the growth of onions is true, I will make this statement. It is well known among onion-raisers, that when they plant a piece of new ground, the onions the first year are very liable to have scullions, and that, the longer you continue to plant the same piece with the same crop, the more perfect will be the product. In consequence of ploughing this piece two inches deeper than it had been ploughed for the last six years, one-third of the onions were scullions. I have learned from these facts that an onion bed should always be ploughed to a uniform depth.

On motion of Mr. Clement, the Board adjourned, to meet again at 7 o'clock in the evening.

EVENING SESSION.

The Board met at the hour appointed, Captain Moore, of Concord, occupying the chair, to listen to a lecture on

THE AGRICULTURAL FEATURES OF THE AMAZON.

BY PROFESSOR AGASSIZ.

Gentlemen of the State Board of Agriculture, Ladies and Gentlemen,—We meet here to exchange our experiences, and it has lately been my good fortune to visit scenes which are not very familiar, and an account of which I have supposed might not be unwelcome on this occasion. Moreover, an event has taken place within three months which will have a decided influence upon the progress of industry and commerce, and it is connected with the scenes to which I shall allude. Therefore, of that event and its influence upon the progress of agriculture I propose to speak to-night.

On the 7th of September last the Amazon was opened to the commerce of the world. It is an event of great importance, and yet it has passed almost unnoticed. Its importance arises from the fact that an immense extent of territory is now open to traffic, which thus far has benefited not even the natives. And yet that region is fertile beyond description. It produces articles of consumption of various kinds which are in extensive demand, and upon which, in short, depend the progress of industry. I will only mention one. India rubber is one of the natural products of the valley of the Amazon ; and where would many branches of human industry be now if India rubber could not be procured, and where would much of the progress which we anticipate in the future be, if the supply of that article was not daily increasing ? Therefore, you perceive, how desirable it must be that we should know something of the growth and production of India rubber, and that we should know exactly how far that article may be produced in the quantity needed by the progress of our daily avocations. I have seen the plant growing; I have seen the harvest gathering; I have seen the way in which it is stored; and I propose to say something to you of that and of other branches of tropical agriculture.

One word, in the first place, on the country itself, for if it was a dangerous land to visit, if it was so sickly that to travel there would be the death of a man from the North, it would be hardly desirable that such a land should be thrown open to free intercourse with all nations. But there never was a country which had a bad repute which deserved it less. The idea generally is, that the valley of the Amazon is a malarious land, pestilential, almost intolerable on account of the insects and poisonous reptiles, and dangerous on account of the wild population. It is not so. Though under the equator, the valley of the Amazon stretches, parallel to the equator, extending a few degrees to the north and a few degrees to the south of the equator, but mainly under the equator—from the foot of the Andes to the Atlantic Ocean, in a straight line of over two thousand miles, and over a width varying from five hundred to seven hundred miles. We should expect, under such circumstances, an exceedingly hot climate. Let me say, that the climate is more temperate than New England. There are no winters such as we have; I saw no such hot days as we have. Our New England climate is what the natural philosophers call "an excessive climate;" that is, a climate in which the temperature of winter sinks as low as anywhere, and in which the summer heat rises as high as anywhere; the consequence of which is, an average temperature which passes for temperate, because the extremes are so far apart that when combined, the result is a moderate average. On the Amazon, it is very different. The highest temperature experienced there is 90° or 91° Fahrenheit. I have been told that the thermometer has shown 91° only once in ten years. I have observed the thermometer myself daily during eight months, and I never saw it rise to 90°. It never falls below 77° or 78°. You see the range is very small. You would therefore expect that the temperature would be very uniform, very monotonous. But there is another circumstance which modifies that in a remarkable degree. The Amazon, emptying into the Atlantic under the equator, faces the trade-winds. The trade-winds blow over the Atlantic for its whole width, and sweep over the valley of the Amazon, from

Para, at the mouth of the Amazon, to the foot of the Andes. The natural consequence is, that there is an enormous evaporation, daily, from that extensive water surface, which produces such a cooling of the water, that in many places, when bathing, I have found it rather cold. And the natural consequence is, that while, during mid-day, when the sun is high, the temperature is very high, the sea-breeze tempers the heat constantly, and when the sun is under, there is a succession of reductions of temperature, which makes the nights cool. In the valley of the Amazon, though under the equator, we have a regular alternation of not over one day's heat, with cool nights. Such a delicious climate, I believe, exists nowhere else on earth. The natural consequence of these physical conditions is, that the fertility of the land is unbounded.

Now, you may ask, how is it, then, that the Amazon has such a bad reputation ?—that all travellers who visit those countries speak of malarious diseases, speak of intermittent fevers as reaching everywhere, speak of a population who look like skeletons, in consequence of their exhaustion by the climate ? There is a great deal of truth in the statement that these things occur there, but they are not the consequence of the climate ; they are the natural consequence of the mode of life of the natives. There are frequent rains, and these rains are very agreeable ; I can say there is nothing more agreeable than to receive a shower in the open air ; it is a natural mode of bathing, and the inhabitants go and take their bath in the shower, every day, but instead of changing their clothes, they allow them to dry on their bodies. They will do that twice or three times a day, without taking any precaution to keep dry, and in those alternations between dryness and moisture, even though the climate is fine, you see at once there must be a predisposition towards fever ; and if, in connection with that, the diet is insufficient, the population will be unhealthy. The indolent character of the population leads them to take very little care. They are not provident ; they do not accumulate a sufficiency of wholesome food in the right season, and the natural consequence is, that in a land of plenty, where all the productions of nature that may be converted into food for man abound, the natives die literally of hunger, and you see starving populations everywhere. Of course, these results will not always be referred to their true cause, and the natural consequence is, the bad reputation which that country has—which, moreover, is entertained by the officials of the country. The president of one of those provinces, sent out by the government at Rio, to administer justice, and to see to the interests of the country along the Amazon, is considered an exile, in an uncivilized part of the realm. He is desirous to go home as soon as possible, and it is for his interest to represent the country as unhealthy, that he may the sooner be greatly rewarded for his devotion. The natural consequence is, that all the officials of the provinces of the Amazon decry the country, and contribute to create and maintain at the capital of the empire, the impression that the valley of the Amazon is an unhealthy country.

I wanted this to be well understood, because I hope to see the day when our New England backwoodsmen will go to the Amazon and take advantage of the endless richness and value of the precious woods which grow there in the greatest profusion, and which are allowed to rot on the spot, without being of any use to anybody. All that is needed, in order to reap the benefit of this rich production of the valley of the Amazon, is to go there and take possession; for those extensive forests are almost everywhere nobody's land, and might be taken possession of by any new-comer; and I know it is the intention of the Brazilian government, as it is in accordance with their interest, to facilitate the settlement of that part of the country, and give every encouragement to the establishment of industrial occupations along the borders of these waters.

Now to travel there is as easy as can be. There are lines of steamers plying between the sea-coast and the foot of the Andes regularly. Twice a month there is a steamer from Para which goes into Peru; and since I left that country the means of communication with several of the tributaries of the great river have been increased; and every day, as commerce is developed, no doubt the communications will be multiplied. I trust it will not be long before small steamers will be run on all those great rivers. At present it is mainly on the main stream of the Amazon that the steamers run; its tributaries have only been incidentally visited by steamers. Of the magnitude of these water communications it is impossible to form an idea without seeing them, they are on such a grand scale. I am afraid to state my impressions, for fear of appearing to exaggerate; but I will give you some figures. The front of fresh water which pours into the Atlantic from the mouth of the Amazon is one hundred and fifty miles wide. This fresh water front is divided into two branches by an island, which is in the mouth of the Amazon, called the island of Marajo, which is half as large as Ireland. The opposite shores of the river above the island are so far apart that it is utterly impossible for the eye to see the two shores at once. You may ascend the Amazon a thousand miles before you have a plain view of both shores, with the exception of a single spot, at Obidos; yet the whole tract is so interspersed with islands that it gives the impression of an archipelago in a fresh water ocean; and when ascending the great river you seem constantly to be between shores, when in reality you sail between a succession of islands. The tributaries are on a scale of magnificence which compares with the main stream. The mouth of the Tocantins, (which is the first great tributary of the Amazon, on ascending from Para, on the south side,) is seventeen miles wide where it pours into the Amazon; and the Tocantins is not one of the larger tributaries of the Amazon. The Rio Purus, which empties into the Amazon over a thousand miles above its mouth, is navigable for steamers drawing twelve or fifteen feet, for a length of five hundred miles above its mouth. The Rio Madeira is another of those giants which may be compared only to the large rivers of the world, and is of the utmost international importance, since it will one of these days furnish a communication not only between the valley of the Amazon and the other parts of the Brazilian Empire, but be a highroad between the Southern Republics of South America and the more northern provinces; for through the Rio Madeira it is possible to establish a direct water communication with the Rio Paraguay, and through the Paraguay with the Parana; and therefore a river circuit might be made from Para, up the Amazon and the Madeira into the Paraguay, and down the Paraguay and Parana to Buenos Ayres, and back again. You see, then, what prospects there are for a country which has such a territory, and over which flow such rivers. And it is, perhaps, more than my words have impressed upon your minds, for we generally consider a river as a mass of water which flows between banks, is encased between these banks, and has a definite course, beyond which you cannot pass. It is not so with the great South American river and its tributaries. The whole slope of the valley is so slight, that from the junction of the Rio Negro to Para, a distance of some fifteen hundred miles, the slope is only two hundred and odd feet; and therefore the whole course of the Amazon is, properly speaking, an extensive plain, over which flows an immense sheet of water, which covers an extensive tract of ground. That water has an annual rise and fall of from thirty to thirty-five, and even forty, feet; and on the southern and northern sides of the main river the rise does not take place at the same season. It is in September and October that the southern tributaries of the Amazon swell; their increase of water pours into the Amazon in November and December; so that there comes a flood from the south side of the Amazon during the autumnal months, which spreads over the whole of that part of the country, and presses the waters of the north side further north and encroaches upon them regularly. In the early spring—in January and February, and even in March—the northern tributaries swell, and press back the waters towards the southern side of the valley; so that the whole is, as it were, like a sheet of water which, in the main, flows eastward, but swinging to the north and to the south alternately, establishing cross communications between all the watercourses to such an extent that it is possible to come down from the Upper Amazon to the neighborhood of Para without ever entering into the main course of the Amazon, on the south side as well as the north side; and these channels are navigable at all seasons. Therefore there is over this immense plain a network of roads established by nature, which forever will be maintained in running order, without any expense whatever to the country. All that is needed to get the advantage of that immense fertility all over the country is to put on steam vessels that may be adequate to the work to be done in the different parts of the valley.

Imagine what facilities there must be; and yet, in the whole of that country, at this moment, there are not more than 250,000 inhabitants. It is a vast desert, unoccupied, the natural products of which rot on the ground, from want of hands to collect the crop. And that crop is of immense value, and is as varied as you can well imagine. I have been told by gentlemen who have lived many years on the borders of the Amazon, that of India rubber alone, not one-tenth was gathered, from want of hands to pick it up at the proper season. And so it is with all the other products. The mode of gathering is even more astonishing. The trees are destroyed for the small fruit. There are no saw-mills in that country, and when the people want to build, they cut down just the most beautiful tree, and shape to the dimensions of the piece of wood they want, with a hatchet. And these woods—what are they? They are the most exquisite in grain, the most admirable in color and in variety, and the most precious for all possible cabinet work, and for constructions of all kinds; woods as hard and as durable as grow anywhere in the world, and which, I say, are not even used in the country itself, and form no part whatsoever of the exports of the country. It is this rambling, careless, indolent population to which I have already alluded, which at certain seasons wanders through the woods and gathers the harvests. It is in that irregular manner that all the products of the Amazon are collected—the sarsaparilla, the caoutchouc or India rubber, the Brazilian nuts, and the hosts of fruits and of fishes, which are used only to a very limited extent, but which are already in some use for various manufactures, either in the small towns along the Amazon, or at Para.

In conversation with intelligent inhabitants, I have ascertained that the planting of the India rubber tree, for instance, would yield immeasurably larger returns than those which the gathering of the natural product has thus far secured; and everywhere would these plantations be as easy as possible. Life is so easy there—hardly shelter needed to be comfortable—the variety of natural products through which life may be sustained grow so profusely, that between fruits and grain and fish and game and wild fowl, there is only a selection needed in order to sustain an extensive population; and I suppose that the only reason why the country has not increased largely in population is, because of the fact, that until recently, it has been shut against intercourse with foreign nations; but the great fact to which I have alluded, which took place on the 7th of September last, has laid the whole open, and according to the laws of the land, the settlement of foreigners in Brazil is made so easy that I trust the riches of that country will not be left ungathered by our active and enterprising population.

Having said thus much of the general productiveness of the country, I suppose it will not be out of place if I allude to some of the products themselves. The family of plants most extensively growing there, and from which the largest variety of products is obtained, is the palm. There is an endless variety of them, and the articles which are furnished by each one are numerous also. But before I proceed to that, let me give you some idea of the character of the river communications of the Amazon.

Here we have the course of the Amazon [representing it on blackboard.] Near Para, we have two great branches, which surround the island of Marajo, and here comes the Tocantins, which descends from the table land of Brazil, and pours into that southern branch of the Amazon. The Araguay comes next; it does not come as a body in the Amazon, but sends off branches which pass into the Rio Tocantins, before it has reached the Amazon, and so that inter-communications are established of which I spoke before. And here comes the Tapajoz, uniting with the Amazon at the place where stands the city of Santarem. That, too, sends off branches, and these, again, establish inter-communication with the Amazon itself; so that you have a network of rivers communicating with one another over a width of at least sixty, eighty, one hundred, and one hundred and twenty miles; and that constitutes, properly, the bottom of the river system. Higher up, these inter-communicating branches are not so numerous. But let me go one step further. Here is the Madeira. Now, the Madeira sends off a branch which comes to unite with the Tapajoz, receiving itself a number of large streams. The Rio Andira, which empties into this branch of the Amazon's stream, is, at the point of its junction, ten miles in width. Thus one branch of a branch of the Amazon is, where it pours into the Rio Madeira, ten miles in width, at the time when the river is full. This land here [representing an island,] is known as the island of Tupinambaranas, and it is a network of islands and lakes which is very striking. Now, I come to the Manhes, which is a lake here. Then here is another river, the Rio Negro, one of the great rivers which comes from the table land of Guiana, which has another branch here, the Rio Parana. We came down the Amazon to the island of Tupinambaranas, on a government war steamer. These waters had never been navigated by a steamship, and the question was how far it was possible to navigate them; but the captain, judging from the general system of inter-ramification of these rivers, had no hesitation in putting into this network of rivers, passing across the island of Tupinambaranas, reaching the river Ramos, ascending the river Manhes, and landing us at the town of Manhes, after a navigation of over one hundred and twenty miles, through regions which have not been explored, which have not yet been sounded. They go there with their steamers as they go into the open ocean, so much has the whole of this valley the character of an open sea, interspersed with islands.

Now here is another river, the Trombetas, which joins the Amazon near the city of Obidos—a river, the name of which, probably, has hardly been heard in New England, but which is navigable by the largest steamers; and higher up there are similar branches, extending in the same direction, with extensive courses, which enable one to come down from the Rio Negro to the Trombetas without entering into what may be considered as the main valley. Now, to give an idea of the dimensions of this network of rivers, I will say that it covers a surface of from one hundred and twenty to one hundred and sixty miles in width. But that is not the only characteristic of these singular watercourses. The main river sends branches to its tributaries; and no better proof can be given of the slight difference in level which exists between them. After ascending all day, by steam, the Rio Negro, above its junction with the Amazon, we came upon a branch coming from the Amazon itself. See how that could be ascertained without a survey. The Rio Negro is a black water river—that is, a river carrying clear water, darkly colored by the decomposition of vegetation, and not flowing through muddy banks, and therefore in no way turbid—carrying no whitish deposits; while the Amazon itself—the main stream—and the Rio Madeira and some others, carry an immense quantity of mud, and the water is turbid, whitish—so much so that you perceive the Amazon over a hundred miles at sea before you enter its mouth. Now, after travelling a day up the Rio Negro, suddenly we saw a large stream of whitish water emptying into it, and, on inquiry, we were told by the pilot, who was familiar with that region, that it was a branch of the Amazon which poured into the Rio Negro, which Rio Negro is itself a tributary of the Amazon. And higher up you have the same phenomenon repeated in the Japura, which sends branches into this network to which I have referred, but which, higher up, receives its branches from the Amazon. Therefore these tributaries of the river, near their junction, are so nearly level with the general surface of the whole land, that while they pour the bulk of their water into the main river, they receive branches from the main river; and this especially at the time when the rise of the mass of the waters alternates from the south to the north.

I will now, as I have this diagram before me, just recall what I said concerning the alternate rise and fall of the waters. From September to December all the tributaries of the Amazon which are on its southern side rise gradually. By December this flood has reached the axis of the valley, and pushed to the north all the water from those northern tributaries, which at that time are at their lowest. In the latter part of January and in February and March, all these northern streams swell and rise, and press against the southern rivers, which by that time have emptied the bulk of their waters into the Amazon, and so the northern waters are now pressing south. And it is this swinging of the great mass of waters right and left, (this is, north and south,) while it flows east, which has established all this network of inter-communications which is the characteristic feature of the Amazon, and in which that river differs from all other rivers known.

The first indication of this singular and striking system was obtained when Humboldt visited South America, when from the waters of the Oronoco he passed, without interruption, into the waters of the Rio Negro. There is a stream known as the Cassiquiare, which, after flowing from the east westwards, divides into two branches, one of which flows northwards and empties into the Oronoco, while the other flows southwards and empties into the Rio Negro. Now Humboldt ascended the Oronoco to the point where it receives the north branch of the Cassiquiare, and, ascending that north branch, passed into the south branch, and thus reached the Rio Negro without interruption. Now such communications, which, when first mentioned, we hardly believe to exist, form the character of the whole river system which we know by the name of the Amazon. And it is not a particular feature, only to be found in the connection of the Rio Negro with the Oronoco through the Cassiquiare, but it is a general fact; it is the character of the inter-communications of this great river system. All the water from the tributaries of the Amazon, passing from so low a level, covers such an extensive tract, that as the water rises or falls, the main river sends branches into its tributaries, as the tributaries send their water into the main stream.

It requires hardly a further illustration to show how easy must be the communications in that country; but it is to be forever a water communication. There are such small tracts of continuous land above the water through the whole year, that railroads will forever be out of the question in that country; and even common roads cannot be used there for extensive travel. The land is generally low. That is one of the peculiar characteristics of the whole country—even and low. Where the banks of the river are most abrupt, where the river has cut new channels, and where, in consequence of these erosions, masses of land have fallen in and formed steep banks, they rise hardly more than thirty or forty feet, at most sixty feet, above the level of the river anywhere. It is probably the most extensive and most even plain in the world, unless the great desert of Africa has as extensive and flat a surface as the valley of the Amazon.

Geologically speaking, it is the most curious country known to science. The whole of that land consists of materials ground and carried along by the same cause which has accumulated our drift. It is drift, and the similarity to our drift is most striking. All these drift-beds which cover New England, and which form such a rich soil after the large masses of pebbles have been taken out from it—rich because it is the result of the attrition of the most diversified rocks—all that drift is of the same character as the materials which form these Amazonian plains; and you see at once what singular vistas it opens into the past when we consider the probable causes or forces which have ground these materials to their present condition; for if our drift has been ground by glaciers, the drift of the Amazon is so like the drift of the North, that there is no escape from the conclusion that even these tropical regions were once under the ice sheet. But I will not here dwell upon a topic which is foreign to the subject on which I desired to speak, but only state that there is this remarkable resemblance between the loose soil of the North and the loose soil of the tropics; and whatever may have been the plough which has ground our rock to make it fertile soil for man to dwell upon, that same agency has been at work upon the plains of the valley of the Amazon, and has produced the same results. Everywhere it is drift which is the most fertile soil all over the surface of the earth.

There is only one tract of land which has hills of some striking dimensions, and that is between the mouth of the Xingu and the mouth of the Rio Trombetas. On the north side especially, there are remarkable hills, and on the southern side somewhat lower ones, but equally striking in appearance. These hills are particularly impressive because of their form. All mountain ranges everywhere have undulating crests, have inequalities on their summits, and changes in their direction; but these hills of Obidos and Almeirim are flat-topped, with sides as even as the gable of a house; and these flat-topped mountains extend considerable distance. They were for some time supposed to be spurs of the table land of Guiana, or the table land of Brazil, and had never been accurately measured. It was during my journey that, for the first time, I suppose, the means for measuring them were brought to their summits, and we ascertained that they are much lower than they appear. The impression is, when looking at those mountains from the centre of the river, that they are many thousand feet high; they stand so abruptly, that the eye is deceived, and the impression is so grand that you might suppose that there was a very high mountain range rising on the borders of the horizon. But when actually measured, they were found not to be above nine hundred feet high. It is very curious how the eye, in attempting to measure dimensions on so large a scale, is deceived. It would at first appear, that owing to the very extensive plains, high mountains might produce the impression of low hills. There it is exactly the reverse. Hills not reaching a thousand feet in height, make an impression as great as that of the Alps. The scenery, in fact, recalled to my mind the familiar views of the Alps, in Switzerland, the lower hill on the opposite side reminding me of the Jura.

Now, in those hilly regions, there are extensive grazing grounds, and very large herds might be raised there. It will one of these days be the pastoral district of the Amazon, and there will be, probably, the rural district of the country, when the raising of cattle has become a regular occupation. At Ereré, a little village among those hills, I have tasted mutton as good as I ever tasted in New England, showing that the quality of the grass is favorable to the raising of animals; and that region, owing to its hilly character, is so temperate that it would form a most desirable place for agricultural settlements.

You know the Brazilian nuts which come to us from that country. They grow on one of the most majestic trees known in creation. The tree which bears the Brazilian nut is one of the giants of the vegetable kingdom. It belongs to the myrtle family, and its appearance is very peculiar. It grows like a large, closely formed pyramid, and towers above all the other trees of the forest. That and the Sumanmeira, form the two choicest trees in the Amazonian region, and are the trees which give character to the forest and the landscape. The Sumanmeira, which is a kind of mallow, rises above the forest in the shape of a tall stem, at the height of eighty and more feet, frequently having a diameter of ten or twelve feet, and its crown spreading like an umbrella over the forest; so that, from a distance, these flat-topped trees give one the impression of umbrellas in a crowd, on a rainy day, one spreading over the other. These trees give a peculiar character to a part of the forest, and between them, we have these close cones of dark green foliage, which are the Brazilian nut trees. There are no two trees so impressive as these. The Brazilian nut is a large nut, not unlike our ordinary walnut in external appearance, only the bark is somewhat smoother, about the size of your two fists, and containing some twenty or thirty or more nuts inside. Now, all the products of that tree which come into the market are merely the accidental gatherings from the ground. Hardly anywhere is the tree cultivated; it is only what is gathered by chance off the ground, which is brought to market. In two places only on the Amazon have I seen cultivated nut-trees, and these had been planted for ornament in front of houses.

A few words about palms may contribute to give you some idea of the peculiarity of the vegetation of those regions. Palms themselves differ from all other plants in their growth. The stem is regular, remarkably straight, and the leaves are generally in a tuft at the summit. That is the appearance of most palms. The leaves themselves exhibit two types—one in which the leaflets are of the same length, and spread like an open fan, and another in which the midrib is elongated, and in which the leaflets are placed right and left on the side of the midrib, like the barbules of a feather. These two types extend through the whole family of palms. There is no intermediate form; but the palms themselves differ from one another in their dimensions, in the combinations of their leaves, in their arrangement, in the character of the wood, in the character of the bark, in the height and shape of the tree, the appearance of the flower, in the appearance and size of the tree, and in the character of the fruit.

To give you some idea of the various kinds of these palms, I will describe some of them. The Miriti, for instance, which is one of those from which the largest number of useful materials is derived, is a palm, the stump of which is about the diameter of my body, and it shoots up straight to the height of fifteen, eighteen and twenty feet, and on the summit spreads the fan-like leaves, not very many in number, but of colossal dimensions. I was desirous, when I first saw that tree, to obtain a leaf, and I sent a man up the tree, with a hatchet, to bring me down one. He sat in the angle of one leaf, in which he was as secure as he would have been in the forked branch of an oak tree, and chopped away with his hatchet for many minutes before he had cut through the leaf stock, which brought down a single leaf; and when that leaf was on the ground, it was hard work for a man to raise it. That is the kind of foliage which that particular species of palm produces; and it has bunches of fruit which are not unlike in their arrangement a bunch of grapes. I have plenty of these things at the Museum in Cambridge, but they are at present accessible only to myself and one or two persons at a time, because they are so crowded that there is no possibility of going between them; but one of these days, they will be visible to all. Now, one spike of the fruit of this tree to which I have referred, is so large that it could hardly be laid on this desk. It has branchlets nearly two yards in length, and each one of these branchlets supports a nut about the size of a large egg ; and when in full bearing, one single bunch is so heavy that it is a good load for two men. I have one such bunch at the Museum, from which the fruit has dropped, it is true ; it is like a bunch of grapes, the berries of which have been taken off ; but the bunch itself is there to show the dimensions, and a barrel of fruit which was hung up on that bunch stands by its side.

Now this fruit contains an oil which is of great value ; it has a pulp which is very palatable ; it has a fibre which is invaluable for the manufacture of cordage ; and the wood itself is of very great durability and beauty, and may be used for a great variety of purposes. I am told by a friend from Brazil, who is just at this moment with me at Cambridge, and who was recently at the great Exposition at Paris, and saw there an exhibition of all the woods of Brazil, that nothing excited admiration and wonder so much as one dish, in which the different varieties of palm woods and their products were brought together. I have myself seen an exhibition at Para, in which the products of the Purrines were brought together, and where the palm and its various products formed the principal objects exhibited, and astonished me by their variety. I am told that the English have begun to appreciate the value of this palm fibre for cordage, and that at this moment an exportation of palm fibre has commenced for the manufacture of cables for the English navy. These fibres have one peculiar characteristic, which renders them of great value for such purposes: they are so light that the cables do not sink, but float. You see at once the importance of such a fibre—so strong as to be superior in tenacity to all other textile fabrics, and yet so light that it will not sink in water.

Now other palms have a totally different aspect. There is, for instance, the Little Marajah. It is a palm only six, eight or ten feet high, a stem not thicker than my thumb, growing in marshy ground and rising like water-bushes from the water, and coming to be about two feet above the level of the water when the fruit is ripe, throwing out bunches of flowers and then bunches of fruit, which, when ripe, are so like our Black Hamburg grapes that they are served after dinner on the table in the place of grapes. And their taste is as diversified as possible—far more so than are the different varieties of grapes. Some of these bunches are purplish in color, some are sweet to the taste, and some have an aromatic flavor besides, and indeed a variety which is quite surprising; while others are farinaceous, and really remind us of the different kinds of nuts which we use for the table; and in addition to that they have a fleshy envelope, which gives an appearance to the fruit exactly like that of a fine peach. There is one kind of palm, known under the name of Pupunha, which the English of Guiana have called the peach palm, which produces bunches of fruit about a foot and a half in length, each bunch containing from thirty to fifty fruits, and each fruit about the size of an ordinary peach, delicious to the palate—a singular combination of the sweet and mealy taste—which is capable of being prepared in various forms. They are eaten whole, they are eaten cooked, they are prepared in various forms, and they make a most exquisitely transparent and aromatic oil.

While these palms are so striking, some of them, for their regularity of form, there are others which constitute vines, creeping like our smilax among the bushes, and extending for a great length in that way, while the stem is hardly thicker than the little finger, and so flexible and so durable that in most constructions the Indians use them in the place of cordage. They use these slender stems of palms as we use rope, and they may be applied for all similar purposes to great advantage. It is of them, also, that they make a variety of tissues, and it is of the more pliable and finer fibres that they weave their hammocks and the different fabrics which they wear. So that the palm supplies the native Indians, the inhabitants of those forests, with everything. It gives him the rafters for his house, the wood for his canoe, the fibre for all the uses to which he is capable of applying it; it gives him the various articles of food he wants; it gives him the means of covering himself; and many of them furnish in addition a kind of wax, of great excellence, which, if introduced into our commerce, would be of great value for the manufacture of candles and the like.

I know of nothing that is more attractive than this family of palms and the great variety of their products; and I believe it would be worth while for one who is familiar with the various branches of industry which would be benefited by a new supply of materials, to visit that country and examine its resources from an industrial point of view. All I have told you of these things, I have gathered incidentally. It was not the object of my journey. I observed these things when I had nothing else to do; or rather, as I could not help seeing them while I was doing other things. I have no doubt that any one who would go there for the purpose of ascertaining what are the various useful materials which might be gathered there, what are the places where the gathering might be done to the greatest advantage, what are the places where settlements could be made which would be most appropriate for the objects in view, would render an immense service to our community. For these things are used; we receive them only accidentally, as it were, because they have never been regularly cultivated, and because the supply which comes to us is one which cannot be regularly depended upon. As soon as cultivation should replace this accidental gathering—as soon as the endless variety of products to which I have not even made an allusion should be brought into the market—I have no doubt that the valley of the Amazon would be one of great interest to us. Remember, that it will be more advantageous for our northern population to go there to gather this wealth than to any other parts of the tropical region, on account of its proximity, to begin with, and on account of the character of the climate. In eleven days from New York you can be in Para; in a fortnight after leaving New York you can be at the junction of the Rio Negro with the Amazon, a thousand miles above the mouth of the Amazon; so that it is at our door, and the facilities of communication are so great, that we should take advantage of this source of valuable traffic, now that it is thrown open to all nations, before others have taken the cream from the field. And it is because I see the immense advantages to be derived from this opportunity that I have ventured to introduce here a subject so foreign, on the whole, to the regular occupations of the members of this Board.

Let me only add, that besides the articles to which I have alluded, there is a variety of dyestuffs as great as the various kinds of wood of which I have spoken. There is a variety of most delicious fruits, also, which are never exported to our markets, but which might be sold here regularly. Instead of those diminutive, insipid pine-apples, which we get from the West Indies, we might have those magnificent fruits which grow in the valley of the Amazon, which are pine-apples on a gigantic scale; so sweet, that sugar would only spoil them; so fragrant that they exceed all that is known among fruits; and they can be easily brought to us. When I left Para, I bought one of these fruits for two cents, and brought it with me to Cambridge. It was seen in New York by some of my friends, who said they would give twenty or a hundred dollars to be able to present on festive occasions such a fruit upon their tables. Now, that fruit can be bought for two cents apiece at Para, and can be brought to our market with the greatest ease, for I have done it myself. And what is true of fruits, what is true of dyestuffs, is equally true of a variety of oils which all these plants produce, and which would probably supply a great deficiency in many articles of manufacture.

But I will not trespass upon your time any longer. I thank you for your attention.

Dr. Loring moved that the thanks of the Board be presented to Prof. Agassiz for his able and interesting lecture, which motion was carried, and the Board adjourned.

THIRD DAY—MORNING SESSION.

The Board met at 9 o'clock, Mr. Alexander Hyde, of Lee, in the chair.

Before resuming the consideration of the subject of ploughing, some discussion took place with reference to the appointment of a chairman for a year, instead of a day, and also as to the propriety of limiting the time to be occupied by the speakers, which terminated by the adoption of a motion, submitted by Mr. George A. King, of Barnstable, that the general subject be committed to the committee appointed last year, and that they be requested to report upon the subject the first day of the meeting in January.

On motion of Mr. Porter, Mr. King was added to the committee.

On motion of Mr. Slade, it was voted, that at the close of the afternoon session, the meeting adjourn *sine die*.

The Board then resumed the discussion of the subject under consideration at the adjournment last evening, that of Ploughing.

Mr. Ward, of Shrewsbury. I find that I was grossly misunderstood in some remarks that I made yesterday. I find, too, that I do not use the same dictionary as some other people. For instance; in conversation with a member of the Board, in relation to certain ground, he said to me, that in his vicinity, they were ploughing up their meadows. That was the idea he conveyed—perhaps not the precise language. Now, in my neighborhood, where I was born and brought up, we call no grounds meadows, but wet land. In certain other localities in the State, all grounds that are mown are called meadows. In the few remarks that I made yesterday on the subject of ploughing, I spoke of ploughing light soil, and said I would plough it shallow. Now, by light soil there, I intended to be understood as referring to soil that is gravelly, and has but very little surface soil; and by heavy ground, I meant to be understood as referring to clayey subsoil. I find that the remarks I made were not in exact accordance with the views of some members of the Board, who understand light soil to be sandy soil, and that that soil should be ploughed deep. I desired to make this explanation, in order that, if there be any record made of what was said, there may be a perfect understanding. I think that every man who holds the plough, or who controls the plough, must be the judge of his own soil. We cannot lay down any definite rule that will precisely apply to every locality, and every farmer must be the judge of his own soil, and of the necessity of ploughing deep or shallow.

Mr. Clement. I think it exceedingly desirable that our discussions should be distinctly understood by ourselves, at least, and that they should be so conducted that the thousands who are to read them hereafter may really know what we mean by them. It seems to me that when we discuss any particular matter, it ought to be presented in such a way that it shall go out in a form implying a recommendation (if not directly recommending,) of some particular mode or system that may be adopted; although I am perfectly aware that it is altogether out of the question for us to recommend any particular rule to be applied to ploughing throughout the State generally. As Mr. Ward has said, a man must be his own judge; and a man who cultivates the soil ought to have a good share of practical common sense, which will enable him to judge how deep to plough, and whether it is best to subsoil. I do not think it would be wise for this Board to say anything which would look like a condemnation of subsoiling, *in toto;* for I suppose every one of us can imagine soils which would be benefited by subsoiling; and, on the other hand, all of us would have no difficulty in seeing that there are soils which cannot be benefited by subsoiling—it would be labor wasted; and a great proportion of the soil of this State is of such a character that it cannot be benefited by subsoiling. And while this matter is being discussed, I would like to have something go from the Board which shall look like a sort of recommendation that certain soils be subsoiled, and certain other soils not, so that, in reading our discussions, those who did not hear them, and were not able to listen to the minute explanations which we make, shall gain some light thereby. For the reports, which used to be little used years ago, are now sought for with avidity. I think it is very important that we should endeavor to make them instructive and interesting, so that any one who comes here shall be improved by what has been said. As was said last year, we all want to improve from year to year, to grow more intelligent from day to day, and be gathering new facts all the time. I am sure that is my desire, and if I did not feel so, I would not hold a place on this Board, because I have plenty of business at home to engross all my care and attention; but I desire to learn from what is said by others in these debates, and from what is read here, in the shape of essays, and I desire to take part in discussions. We are so constituted that all these things, I trust, operate beneficially upon each and every one of us.

But I have wandered away from the question of ploughing. My own view of ploughing is this: that on our light, sandy soil we want to plough pretty deep, in order to extend the influences of air and moisture through the open, porous subsoil. The roots of all plants will run deep in such soil. If you will raise the turf carefully, where a piece of such land has been in grass for a few years, you will see that the grass roots extend very deep in all dry soil, where they go for moisture, and for nourishment aside from moisture. Then, again, on hard, stiff soil, where the subsoil is gravelly and coarse, and not worth bringing up for the sake of improving it, I should plough shallow.

Then, in regard to the burying of manure, I do not know that it is very material to cover the manure deep in sandy soil, or otherwise; but it should be covered. I am in the habit sometimes of planting what we call pine plains. The soil is very light and porous; we can hoe the corn immediately after a shower and there is no sticking of the soil to the hoe. It is mere boy's play to take care of the crop on such soil. It is true the fertilizing properties of manures are soon exhausted on such soil.

Mr Birnie. Do you plough deep or shallow?

Mr. Clement. We plough deep, because if we did not, the leaves would roll in a fortnight. I have never perceived that corn was very much injured by rolling a little, if it did not get so dry that it did not unroll in the night; but if you find the leaves rolled in the morning, after having had the dew upon them, you may depend upon it, it has suffered. Now, if you plough the soil deep, and plough in the manure deep, the moisture is retained longer, and the crop seldom suffers.

A Member. How deep do you plough?

Mr. Clement. Seven or eight inches. We generally plough in the manure, and we get the benefit of it the first year. If we plough in fresh manure, even, from the stable, the next spring, if we plough again and sow grain broadcast, we scarcely see anything of the manure; it has rotted and gone into a soluble state, and the bulk of it has been taken up. At any rate, it seems to have been diffused into the soil and taken up by the crop, even if buried deeply. If you should plough that depth in heavy, clammy, tenacious soil, you would scarcely receive any benefit from the manure—it would be lost. Then there are medium soils—soils which are moderately wet—which I think it will do to manure pretty deeply—what we would regard as an ordinary good corn soil. We know that a heavy soil is not appropriate for corn. As I remarked yesterday, corn will not penetrate to cold earth; it is against the nature of the plant altogether.

These are the rules by which we are governed in ploughing in our locality. Light soil we plough pretty deep, and more shallow as it approaches a heavy, tenacious soil, unless there is something in the subsoil which leads us to think the land will be improved by subsoiling or turning up something more. But in our locality the soils are of such a nature that the subsoil does not seem to be much. We do not have clay. There is scarcely a farm in our locality where there is any clay perceptible. In some places there is just enough to show itself, if you stir a little puddle, by whitening the water, but not enough to improve the soil materially.

Now, whatever may be said hereafter in relation to this subject, I hope we shall be able to agree upon something, so that, as I remarked before, those who read these discussions, shall obtain some information from the remarks that are made here.

Mr. Cole. The whole tenor of the remarks made here yesterday, was to the effect that shallow ploughing was best; and the remark of Mr. Ward, that he ploughed from four to six inches, was contrary to the idea of deep ploughing; and I would like to ask him if his results would not have been more satisfactory if, instead of ploughing up four or five inches of soil that had been turned up before, he had brought up, at each ploughing, an inch or two of the soil below? When I was a boy, my father ploughed shallow. I have seen furrows ploughed upon our farm not exceeding three inches; as Mr. Smith said yesterday, it made the harrow fly round pretty lively. My father came to the conclusion that it might be improved by deeper ploughing, and at each breaking up it was ploughed a little deeper; and where it was then sandy soil we now get good crops of hay and fair crops of corn. We plough it now six or seven inches. I have now another piece of stronger soil, very stony, (the first piece to which I referred is free from stones,) which I ploughed with three horses as deep as I could. I ploughed it, I think, about nine inches, and should have ploughed it deeper if I could. Then the last time it was ploughed it was ploughed deeper than it had ever been, and the result was, we had the largest crop. I do not know but it may be wrong, but that experience proves to me that the better way is to plough deep, and instead of going down only three or four inches to bring up an inch or two at each ploughing of the subsoil.

Mr. Ward. I cannot say that I think the crop would have been improved if a little of the virgin soil had been turned up, because, just as you add the virgin soil you have got to add manure enough to bring that up to the fertility of the original soil. Therefore I do not think it advisable to plough up any of it.

Mr. Johnson. I like the remarks of Mr. Clement and Colonel Ward, and also of the last gentleman who spoke, and I agree with them as a general thing. I think there can be no rule established in regard to the depth of ploughing, because the soils vary so much, even upon any one farm, in my locality, that we can establish no rule there for the depth of ploughing. On some of our gravelly, sandy soils we plough pretty deep; on clayey soils we do not plough so deep. We have forty acres of land that is clay bottom mostly. It has a good many stones in it. About three acres of that land we have spaded with the narrow Irish spade. I spaded down into the clay, turned it all over, harrowed it, brushed it, and it has produced good crops for the last two years, with two top-dressings.

When I first commenced ploughing upon clay land I ploughed pretty deep. I ploughed in the fall, and in the spring it troubled me to cultivate it and get it ready to plant, it was so wet and soggy. Lumps as big as my fist were scattered all over the ground, and it was almost impossible to work it. Then I commenced ploughing that land not so deep, about five inches, and ploughed it in the spring, about three days—sometimes only one day—before I put the manure upon it; but it worked nice and mellow, and I got much better crops than when I ploughed in the fall and ploughed deeper. I find that with fall ploughing the ground does not work so easily as it does when ploughed in the spring. My mode of ploughing is to plough as near the time of planting as possible. I like to get in my grain from the 10th to the 15th of May, if the land will permit of it; if not, it has to go in later, but as soon as I can do it. I plant my corn and potatoes the first of June, generally. I spread my manure on and harrow it in with a two-flanged harrow. It does not put the manure in very deep unless it is very fine, and mine is usually rather coarse. Then I strike it out with a striker and plant it. If I have time in the fall I plough the ground and let it lie and take the winter freezings, and in the spring I plough it with a pair of horses and harrow it. In the course of a few days I cross-plough it with a light plough and seed it. On my old ground, where I plant one year with seed, I put my manure broadcast; then I plough with two horses and let it lie from two to ten days, just as it happens. I plough that also twice before seeding. The second time of my ploughing, after seeding, I plough a little deeper than the first time, so as to get up a little of what Colonel Ward calls the virgin soil; and the second ploughing mixes it up with the soil, and I have better results than I otherwise should. I think I want some of that soil, but not too much of it. After ploughing it the second time I bush it, and then I sow it and re-bush it. That is my habit in seeding my ground.

I once took up a piece of ground where clay did not predominate so much as it does in some parts of my ground. I ploughed it ten inches deep. It had not been ploughed for twenty years, certainly, and I am not certain that it had been for forty years. I manured it thoroughly, broadcast, planted it with potatoes, and got a very light crop. I ploughed it again, and manured it as usual—let the plough go down seven inches, but usually I think my ploughing would be only about six inches deep—but I never have got a very good crop from it yet.

Mr. Birnie. How many years ago was that?

Mr. Johnson. Probably 1852, or 1853. The last time I seeded it was three years ago. I mowed it twice and it has not recovered; it is not as good a piece of mowing as the piece adjoining it. It did not give so much grass this year as the piece adjoining.

Mr. Birnie. It is rather a stiff soil?

Mr. Johnson. It is, but not so much so as most of this forty acres.

A Member. Did you plough the second time seven inches deep?

Mr. Johnson. No, sir; I ploughed about six inches deep.

Mr. Hubbard. We shall all readily see that ten inches is enormously deep. We are very likely to think that we plough deeper than we do. I find by actual measurement, on land that I should say was ploughed seven inches, that it is not ploughed so deep. Now, to plough ten inches is enormously deep—it is certainly three or four inches beyond what is termed deep ploughing. I have no doubt in my own mind that if we should plough our ground by measurement ten inches deep, we should suffer exceedingly from it. I should call six or seven inches deep ploughing, and if I should go three inches beyond that, I should expect to suffer exceedingly from it. The character of the season makes a difference in this respect. If the season is dry, and we plough shallow, we shall suffer very much quicker than if we ploughed deeper.

Mr. Cole. If six inches is deep ploughing, I would like to have Mr. Hubbard define shallow ploughing.

Mr. Hubbard. Six or seven inches I said. I must say, that I should consider nine and ten inches enormously deep.

Mr. Birnie. I question if we have many places that will bear ploughing ten inches deep. I know one of our most successful farmers, located on a sandy plain, who puts his plough right down to the beam, and it is an extraordinary plough. He cultivates one part of his land as a market garden. His argument is, that the land retains the moisture, and he has never any fear that his crop will suffer in a dry season, and he gets tremendous crops. But my experience, on my land, would be like Mr. Johnson's; so that it is very evident that circumstances must control this matter. We cannot lay down a rule, for all parts of the State, that a certain depth of ploughing is necessary; we must be governed by circumstances.

Mr. Johnson. In regard to the team I used, I will say, that at that time, I had been taking out the stones from some low ground, and it required a pretty heavy team. I kept six heavy oxen at work upon that land, and I cleared it pretty much of stone. I put four of these oxen on a large grass plough, and all my endeavor was to keep the end of the beam out of the ground. I wouldn't be surprised if I ploughed some as deep as twelve inches. It went very deep, and it did not turn the furrow over entirely, but it laid up, and some was rolled over. It was a coarse piece of ploughing. I let out a piece of this ground to be planted. The man was a firm believer in deep ploughing, but I persuaded him not to plough too deep. He ploughed that ground, I should judge, about eight inches deep, and planted it with a crop of potatoes, and there was not a weed on that field during that whole year. But the crop didn't pay for hoeing, to say nothing about ploughing. The man performed the labor very well, and subdued the land thoroughly, and I had to make him an allowance, because he couldn't afford to lose the crop. I have ploughed the field twice since, from five to six inches deep, and I have got crops of potatoes and corn; a heavy crop of potatoes for us. Not such a crop as this gentleman from Williamstown has been raising, but heavy as potatoes have gone for the last few years. Ten or twelve hills made a bushel; and they were all large and nice. This experience evidences to me that that kind of soil will not allow of deep ploughing.

Then I have another piece of ground—a sandy, gravelly soil—which I ploughed, several years ago, when I first bought it, deeper than I do now, for I found deep ploughing was recommended, and planted it with corn, and did not realize half the crop I have realized since by shallow ploughing, on that land. I say, therefore, it is impossible to lay down any general rule for ploughing. Mr. Demond was here yesterday, and would have been glad to have spoken upon this subject. I know of one instance which occurred near our institution, on ground belonging to Mr. Butler. Mr. Demond ploughed it eight or nine inches deep, and Mr. Butler found fault, because he said land ploughed deep did not produce so well as that which was ploughed shallow. Mr. Demond went upon the ground in the fall, and it turned out that where he had ploughed there was the best crop of corn. That is sandy soil.

Mr. COLE. The southern part of Berkshire has raised such crops of corn that the eastern delegates are a little doubtful about the truth of the stories; and I call upon Mr. Thatcher. I think he can tell us something about how they plough there, where they raise such crops of corn.

Mr. THATCHER, of Lee. I should present the same results which Mr. Johnson has stated. We are now using, in southern Berkshire, a plough which turns over the sod from six to seven inches, with a subsoil attachment running from two to four inches still, which does not lift the virgin soil the first year to the surface. This attachment, running behind the mould-board to the depth of four inches, usually stirs the whole width of the furrow to that depth, after we have turned over the sod.

Our idea is, that by loosening the subsoil by this attachment, we enable the rains to soak down through, which they would not do, our subsoil being clay, (which will not take in water, unless the earth was loosened,) and our corn roots run down there to get their moisture. The effect of the manure is felt there; and the second year, when we come to plough up again, after this stirring of the subsoil, we drop our ploughs down and throw up part of this subsoil. I can illustrate the effect of that, perhaps, in this way. If you take a small box, and fill it five inches deep with ashes, and turn on a certain quantity of water, enough to make the ashes extremely wet, you will see at once that there will be a caking of those ashes, that is, a hardening process, which would not be felt if the same quantity of water were poured upon ashes eight inches deep. The roots will run down into that soil, or the ashes (as I am using that illustration,) and the water will be retained throughout those ashes, of that depth, longer, and be more beneficial to the crop, than it could in ashes four inches deep.

I used one year a steel plough with this subsoil attachment, and I turned over my green sward six inches, with the subsoil attachment running under four inches. I think we certainly, in that northern country, derive a benefit by stirring the soil the first year, and very great benefit, without lifting it to the surface, and then lifting it to the surface, and mixing it in the succeeding ploughing. I have in my mind now a six acre piece, which I am confident, in fact I know, would not half feed a cow through the season. We could not get more than four or five inches of soil before we came to a hard clay subsoil, that retained the water upon it, making the land cold, backward, and sour. After ditching that land, and putting in some underdrains (which of course benefited it, without ploughing,) we commenced ploughing this land in this way, to get a deeper soil; not using the subsoil attachment that time, because we did not have it, but using a common plough, following the furrow afterwards, and lifting one or two inches at a time. I am speaking within bounds when I say, that the second year, the crop of corn paid twice over for the labor of ditching and double ploughing. It is as good a piece of land now, I think, as can be found in the town of Lee.

These ploughs are used in almost all parts of southern Berkshire, and I think, where they are used, they are exceedingly well liked. The subsoil, as I have said, is not lifted to the surface the first year, but stirred, giving an opportunity for the rains to penetrate it—and of course the heat of the sun will penetrate it during the summer more than it would if not stirred—and it is lifted in the subsequent ploughings.

Mr. Birnie. You spoke of ditching. How thoroughly was it ditched?

Mr. Thatcher. I put in ditches within two rods of each other, in which I put under-drains. Over the widest part of that piece, I think I put in eight drains. The piece was twenty-six rods wide. On one side, I did not put any drains; it was rather dry land. I did not use tiles; I used the stone on the piece, covered with straw, and then sod.

I should agree with Mr. Johnson exactly, that in turning up that subsoil to the depth of ten inches, I should not expect to get a crop the first year. My plan of ploughing for corn is to turn in the manure in the fall to the depth of six inches; and I always mean to use something to start the corn in the hill the first part of the season. I had a very good crop of corn this last season. I ploughed in a good quantity of manure, and took a great tablespoonful of superphosphate of lime to the hill. I start it with this in the spring, and the roots then descend and get the benefit of this manure which I ploughed in in the fall. I am very much in favor of this subsoil attachment, which we are using very extensively in that part of the State. I should use it on clay lands, certainly. I am in favor of deep soil. The deeper soil I can get the better my crops are. If I am going to raise carrots I want a good depth of soil, where they can run down without bringing up against any rocky surface.

Mr. Porter. I can readily coincide with the remarks just made by Mr. Thatcher in regard to ploughing deep. I am a very strong advocate of deep ploughing; not less than eight inches—from that to ten. I have used the same attachment to which he refers for the purpose of loosening the subsoil, having an attachment that will go down as deep as twelve inches. Our soil is not very clayey. It is a sandy, clayey loam, some parts of it. The Connecticut River soil is not like the soil of the mountain towns. Our mode of ploughing now is very different from what it was when I was a boy. Then our fathers always ploughed from four to six inches deep, and their crops of corn went from twenty to thirty bushels to the acre ; if they got forty bushels they thought they had an enormous crop. We have increased the depth of ploughing, from the time I commenced to farm, from five and six up to nine and ten inches. I have invariably perceived the best results where I have ploughed deep. In dry weather it stands the drought better ; in wet weather it stands the moisture better, for the water has a chance to soak away ; and I always have the best crops.

In regard to the kinds of ploughs we use, I have a plough which has been introduced but a few years, and there are but very few of them with us, manufactured by the Collins Manufacturing Company in Connecticut. It is a steel plough, with which we can turn just as nice a furrow as we formerly did with a cast iron plough six inches. We always plough our tobacco lands two or three times—never less than twice, and oftener three times, in the spring. Our first ploughing is slight —from five to six inches. The object of this is merely to get the manure out as early in the spring as we can, and get it into a state that will fit it to feed the plant as soon as possible after it is set out. Then just before setting the plants, from the first to the fifteenth of June, we plough it again, and plough it deeper—eight or ten inches—depending upon the character of the soil.

Mr. Barrett. The Rev. Mr. Clark, of Waltham, who is here to-day, has had some experience in deep ploughing ; we should be glad to hear from him.

Mr. Clark. I am very much obliged to my friend for giving me an opportunity to say a few words, and I will say but a few words in the presence of the "assembled wisdom of the Commonwealth" on the subject of agriculture. I have myself supposed that this question of the depth of ploughing must be settled by circumstances, and that it depends very much upon two considerations: one of them is the quality of the soil to be cultivated, and the other is the kind of crops we propose to raise. I recollect that last year, at Salem, Mr. Benjamin T. Ware, of Marblehead, a very intelligent cultivator of the soil in the line of market gardening, said the only use he found for a subsoil plough was in loosening up his carrots, so that he could get them out of the ground easily in the fall. I was struck with that remark, and have remembered it, because it was not quite in harmony with my own views upon the subject. I am not much of a farmer myself, though I try to cultivate some few acres of land, and do it somewhat thoroughly. I am more in the habit of spade husbandry than of ploughing very extensively; and I have noticed this, that where I have told my man to spade the land two spades deep, and undertaken to raise carrots, it has required two or three years to recover from the effects. It raised so much of the subsoil to the surface, that even with very liberal manuring I have found it required two years for the land to recuperate itself.

I have had occasion sometimes to dig out rocks, when a great deal of the subsoil was necessarily thrown on the surface; and I have always noticed that land so treated requires some two, three or four years to recover itself from the effect of that operation. In the end it is doubtless a great advantage to have these stones removed; but the life of the soil, for the time being, has seemed exhausted by that process. We bring to the surface a cold, gravelly soil, and it takes a long time for the dews and the rain and the sun to turn it into fertile soil; and yet they will do it in the end, and therefore it is better to have these stones removed.

Three or four years ago I had occasion to build a sidewalk near my house, of heavy stone. No soil was put upon it, but there has sprung up there a fair crop of grass, made there by the heavens—by the action of the sun and the rains, and the attrition of those particles of stone upon one another—for the walk is not travelled much by passers-by. I think, therefore, that bringing this cold soil to the surface, although it is injurious for a few years, is ultimately highly beneficial. We thus deepen the soil, and I think it is very important, especially if we want to cultivate root crops, to have the soil very deep.

I wish we could harmonize the different views with reference to the use of the subsoil plough, which we hear from the gentleman from Berkshire, and those which are entertained in this part of the Commonwealth. In Berkshire they have a very deep soil—an excellent farming region. Here around Boston, where we live, especially in Waltham and that region, nature has not done much for us. What we get there we have to get by the use of money and science, and then we do not get very large crops. I do not think the subsoil plough is of much use with us, until some few years have passed away; then I think perhaps the results of it begin to appear, and it may be said to be a very useful implement for the farmer to use, on the same principle that deep spading is useful, though not for the first few years.

Mr. Brown. The difficulty with regard to ploughing is of the same character as all the difficulties which attend the business of farming. Unlike all other business, we have no precise mathematical rules which we can apply generally to our business. The carpenter has his square and his rule, and scarcely strikes a blow in the course of the day that he does not strike on rule; and when he lays out his work in the morning, he can see in his mind's eye just the result of his day's labor. He knows just how that door or that window-frame must come out, and it will come out just as he sees it. I want to know if any farmer can tell me he anticipates with any such confidence the result of his labors? There is not probably a farmer on the face of the earth who can do it. The business of farming is the most abstruse and the most difficult business men ever engaged in. It requires more learning, more experience, and closer application, than any business that ever devolved upon man to perform; and therefore we can see the necessity of having this Board of Agriculture in the State, to harmonize as much as possible, as Mr. Clark and Mr. Birnie have said, these conflicting views, that in going on with our labors we may do the work that will secure the best results.

Mr. Birnie and Mr. Clark have said, in their remarks, and it is true, that the depth to which land should be ploughed depends upon circumstances. Now, if I were to ask how deep you would plough for a crop of carrots, there is not a man who would say less than twelve inches, and some would say two feet. Then, if I were to ask how deep you would plough for a crop of corn, there are many who would say five inches is enough, six at most, and others would go as high as eight or even ten inches. So it would be with regard to ploughing to get a good crop of English grass. Now, what I beg of you is (because we are looking to you for light from all parts of the Commonwealth,) not to go from one extreme to the other. In all parts of the Commonwealth, a few years ago, they advocated deep ploughing. Now, I see you are going on the other side. You are inclined to swing, as Prof. Agassiz told us last night the waters of the Amazon do, first to the south and then to the north. I say, avoid these extremes.

I have no doubt you must be governed in this matter by circumstances—by the nature of the soil, and the nature of the plant you are going to put into that soil. If you go to an excavation where they are cutting for a railroad, and find a place where herdsgrass and redtop are growing upon the top of the embankment, you will find that the roots of these grasses run from one to six feet. I think I can show you illustrations, in this town, that will satisfy you that roots will run down two or three feet, under favorable circumstances. What would you do with soil where you go down five or six feet before you come to the hard pan? What would the grass do, and what would the root crops do?

Then the effect of drainage is to deepen the soil. The elements of fertility are profuse in the subsoil. Even if it is clay, it is full of the elements of fertility. I heard a gentleman state yesterday that he dug a well twenty-three or twenty-four feet deep, and threw out the gravel, which was spread round the house, and before the month of October, that gravel was completely covered with grass, without any seed, or manure, or anything. Would that grass have grown, unless the elements of fertility were in that ground? By no means. I really hope that you will endeavor to keep the happy medium, and lead us on in it, who are to read your publications.

To illustrate this matter: A few years ago, people went mad about breeds, especially about breeds of pigs; and one man was so taken up with the matter that he went and got a Suffolk pig, and he said, there was nothing like it; that he would eat more and produce more profit than any other man in the world. One day, he tried him, to see how much he would eat. He gave the pig an entire pail of milk, eight or ten quarts, and he drank it all. "Then," said he, "just for the notion of it, I took him up and dropped him into the pail, and the little cuss didn't fill it half full." Let us be able to rely upon what you say, and then you will do good as a Board of Agriculture.

A MEMBER. What could we do with asparagus, in the cultivation of which our people engage so largely, if we did not have deep soil?

MR. BROWN. If you want to deepen your soil, stir it, as Mr. Thatcher says he did. That is the true principle, in my opinion. Then your plants have an opportunity to run down in search of moisture, and there is an opportunity for the water to pass away. Do that gradually, and instead of deep ploughing hurting the soil, my opinion is, you may plough it twelve inches and keep tilling it for several years, and you need not add a particle of manure; the heavens will make it into good soil; from slate color it will become, in the course of a few years, as black as your hat, only let it have access to the heat of the sun. What we want to do is to harmonize these things, so that what is done in various parts of the State will all be applicable to the work in hand; so that we shall not be at work, as half of us are, without any result, losing our time and money. The business is a most intricate one, requiring all the skill and patience and industry we can command; and it is the most exalted labor, too, that man ever engaged in. I am delighted to find this Board going about the State and calling the people together to discuss these important questions; and I feel ashamed that our people in this town do not appreciate it more, and come here to take part in your deliberations.

MR. WATKINS. I should like to ask my friend Mr. Smith how he spoiled his land by subsoiling it, as he mentioned yesterday afternoon? I would like to get these points together, so as to harmonize them, if possible, as Mr. Brown suggests.

MR. SMITH. I have been an interested listener to the discussion upon this subject ever since it commenced, and I had come to this conclusion in regard to the matter, which has been expressed by two or three of the last speakers, and thought it entirely unnecessary for anything more to be said: that it depends altogether upon circumstances—upon the nature of the soil, upon the weather, and the plants which we wish to put upon that soil. Although we may not agree upon the topics on which we speak, it makes no difference. It will not be expected that we shall agree in all things, coming as we do from all parts of the State. With the different soils we cultivate—with the different crops we raise—it is not to be expected that we shall agree in all respects; and although our record may not agree—although it may seem to some that those who shall peruse what we say here will gain no information therefrom—yet we must take into consideration our different localities and our different circumstances, and, as the saying is, each one "pays his money and must take his choice."

I did not expect that the few remarks which I made yesterday would be concurred in by the majority of those present. I made them to draw out discussion. I said that in my opinion the prevailing notion of the community was not so much in favor of deep ploughing as formerly. That I suppose to be the case, and it is our nature, as has been expressed here, to go from one extreme to the other; too much so. We should endeavor, as has been said here, to guard against going so far the other way that we shall retrograde instead of going forward.

From the discussion yesterday and to-day, I have formed the opinion that the majority of those who have spoken are against very deep ploughing; but I have also come to the conclusion, as I have already said, that it depends altogether upon circumstances. We need to know the circumstances in these several cases that have been mentioned. With regard to Mr. Thatcher's experiment, we learn that until that piece of land of six acres was underdrained, the satisfactory results were not obtained. This should be taken into consideration. I cannot recommend deep ploughing upon heavy or wet soil until it has been underdrained; and not only underdrained, but heavily manured. That is the case with Mr. Porter's lands. They are rich. If he manures for corn, it is very heavily, and also for tobacco; and that is the reason why he has such good success with deep ploughing, and why he can follow the practice of deep ploughing.

With regard to subsoiling, I almost regretted that I stated yesterday what I did, because I was not willing to have it go abroad that the opinion of the Board, or my opinion, was against subsoiling, because I am not convinced that it is injurious to the land, if adopted under proper circumstances and on proper occasions; and as an opinion seemed to be expressed opposed to subsoiling, after I said what I did, I said I regretted throwing that out. The circumstances under which my experiment was made I mentioned yesterday. The land was level—

our river bottoms—in a fair state of cultivation. I was fitting the piece for wheat. It was thoroughly ploughed. I followed afterwards with a subsoil plough, and raised and loosened the soil, and let it fall back again into its place. The result was, it took several years, and many loads of manure, to bring that part of the field (for I tried the experiment on only one side of the field,) into as good a state of fertility as the other. But by no means would I condemn the practice of subsoiling; for we all know, as has been remarked by Mr. Brown, that by continually exposing the subsoil to the air, we render it fertile. This we all admit, and we need to stir our soils more, we need to go deeper and deeper every year, we need a more thorough cultivation, and above all things, we need to talk upon the subject of underdraining. Water is the great drawback on the farm. Our lands are too cold. We may till those lands at any season of the year, still it is no advantage, essentially, if we are to be troubled with water in the subsoil.

Mr. Clement. I would like to have Mr. Porter state whether his soil is level or not. I understand him to say he would recommend subsoil ploughing on all land, of whatever character.

Mr. Porter. It is level.

MANURES.

The subject of Manures was then taken up for discussion, and the Chairman (Mr. Hyde, of Lee,) opened the debate by reading the following paper:—

Manure lies at the foundation of agriculture. It is the raw material from which the farmer manufactures his products. So highly is it prized by the Belgians, that they call it "the god of agriculture." The increasing estimation in which it is held in our own country is manifest from the increased price we have to pay for it. In New England the price has doubled within the last ten years. We are not sorry to notice the enhanced market value of manure, for the tendency will be to induce every one to husband his resources in this respect more carefully, and the agricultural products of the country will be increased proportionally. The waste of manure is the crying sin of all new countries. Much as we have improved in New England in the increase of our fertilizing resources, there is still a wide margin for further improvement; and on the virgin prairies of the West we have seen the torch applied to the stacks of straw in order to get it out of the way; and in many places the piles of manure around the barns are considered a nuisance, and if Hercules' mode of cleaning the Augean stables were possible, it would doubtless be resorted to. We have seen, during the past summer, a sewer constructed in one of our large villages with its mouth terminating in a brook, so that the refuse which should go to fertilizing the surrounding country is now carried to that great reservoir of fertility, the ocean. The inevitable absorption by the sea of the fertilizing material of the land would seem to be sufficient, without our adding to the loss by turning our sewers in that direction. Possibly the upheavings of nature, in the course of time, may bring to the surface the vast deposits now being made in the ocean; but it is not worth while to make too large investments where the returns are in such an uncertain future. We think we are speaking within bounds when we say that not half the resources of manure, even in our favored New England, are as yet developed. The object of the present paper is briefly to allude to some of these undeveloped or partially developed resources, and, if possible, to stimulate to a more careful husbanding of the life-blood of the farm; and if allusion is made to the writer's own experience, it is hoped the reference will not be attributed to self-glorification, but to a desire to make that experience available for the benefit of others.

The first resource we will mention is the muck swamp. This is a reservoir of vegetable matter, the slow deposit for centuries of wood-leaves, moss and herbage, for the most part submerged, so as to prevent rapid decay. Possibly these muck swamps are the incipient states of future fields of coal, and may by pressure and heat be converted into that concentrated form of carbon. Be this as it may, they seem to have been reserved by a kind Providence to supply the rapid waste of vegetable matter which always occurs in dry, cultivated lands. As the coal-fields are the great wood-houses of nature, so the muck swamps are her great manure-beds; and as the development of the one has vastly increased the manufactures of the world, so the use of the other tends to supply the demand for the products of the soil which manufactures create. These swamps were formerly looked upon as so much waste, and dreaded as the hot-beds of miasma ; but by draining they have not only been clothed with sweet herbage themselves, but have been made to contribute to the beauty and fertility of the uplands. As a basis for the compost heap we have never found anything equal to muck. In a dry state it is exceeding porous, and consequently a great absorbent of gases. A dead horse buried in it gives forth no effluvia, and shovelled over at the expiration of a year will give half a dozen loads of fertilizing material, rich in ammonia and all the elements of vegetable life. " We speak of what we know, and testify to what we have seen." For a quarter of a century we have used more or less muck every year ; and although keeping little stock, the farm has steadily increased in fertility. We would not recommend applying it directly to the soil, unless of a sandy or gravelly nature. Muck is a great absorbent of moisture, and is therefore naturally cold, and should not be applied to moist clay or loam lands till it has been chemically changed by coming in contact with ashes or fermenting manure. If raised from its wet bed in the swamp and exposed to the air, it gradually loses its cold, sour nature, and may be applied without composting, and with benefit to almost any soil not already abounding in vegetable matter. In this state it is very similar and acts very similarly to chip manure. To get the quickest returns from muck, however, it should be placed in the pig-pen, barn cellar, yard or compost heap.* The catalytic influence of the fermenting manure upon the muck is wonderful. It is much like the influence of leaven in a mass of meal. As with a proper degree of heat and moisture all the meal is leavened, so, with the appropriate adjuncts, the muck undergoes speedy fermentation and decay, and becomes fit food for the growing vegetation. Thus the round of nature from death to life and life to death is accelerated. No definite rule can be laid down for the proportions of a compost heap. The more manure, the quicker is the fermentation. As a general rule, two-thirds muck to one-third manure we have found a good ratio. If ashes are used instead of manure to cook the muck, one bushel of unleached or two bushels of leached are sufficient for five bushels of muck. Lime, also, acts favorably on muck, and one bushel, slaked with brine, will sweeten and render fit for use ten bushels of the vegetable matter. The mechanical effect of muck on the soil must not be passed by unnoticed. A loose, gravelly or sandy soil is rendered more compact and moist, and a stiff clay more friable and less likely to bake and crack.

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* An occasional layer of muck on the pile of horse manure to prevent fire-fanging and add to the amount and value of the pile, cannot be too highly recommended.

As the second neglected source of manure, we will mention the refuse of the sink and the slops of the house generally. As we see them carelessly thrown around many houses, they are redolent with the seeds of death, but appropriately used are abundant with the elements of vegetable life. To dispose of them in the most sanitary and economical manner, should demand attention from every householder. Health and thrift equally require this. Few substances ferment more rapidly and produce a more vitiated air, than soap-suds and the slops of the chamber. The very fact that they taint the air so badly, is proof positive that they contain the elements of fertility, and it is a pity that so few heed the admonitions of that delicate chemical instrument, the nose, and pay so little attention to this source of fruitfulness for the soil and sickness to the family. When the premises are so situated that it can conveniently be done, the best mode probably of disposing of this refuse, is to conduct it by a drain to the barn cellar, where it can be absorbed by muck, charcoal dust or other absorbent. Where the barn is located at too great a distance or elevation, a cess-pool should be dug at some convenient point, and if kept well lined with some absorbent, the amount and quality of manure that can be thus manufactured will surprise those who have not tried it. Care must be taken to furnish the outlet of the sink with proper valves, so that the gases from the pool may not return into the house to the disgust of the olfactory nerves of all the household. The manure thus made is good everywhere, but we have found it specially efficient in growing cucumbers, squashes, &c.

Another neglected source of fertility is night soil. Partly from ignorance of its value and partly from prejudice, night soil has never received that attention in this country which its merits deserve. By most families it is considered a nuisance, to be abated as best it may, often by a bonus to any one who will remove it. Handling it, is indeed, not as pleasant as gathering roses, but the roses may derive from it their exquisite coloring and fragrance. It is one of those fragments that should be gathered, if we desire that nothing be lost. We carefully save the deposit of the stable, and shovelling amidst the filth of the barnyard seems to us but play, as we are accustomed to it and know that what has fed our cattle must go to feed our crops, or farm and farmer will alike be impoverished; but the richer deposit of the vault is neglected, and the aggregate waste is immense. No manure we have ever tried will compare in cheapness and fertility with night soil. The value of animal manure depends greatly on the quality of the food which the animal consumes, and as man is the most richly fed, so his excrements are of the richest nature. In the vault is found fecal matter derived from flour, eggs, butter, beef and pork, all well salted and peppered, and necessarily containing the elements fitted to reproduce this highly concentrated food. Theory and practice agree in placing poudrette at the head of animal manures. Johnston says, dried night soil is equal to thirty times its bulk of horse manure. This is the calculation of the chemist. Our experience with it for many years may not justify so high an estimate, but from no manure have we derived so satisfactory results. Living near a populous village, we have had an opportunity to obtain an abundance, and have not been slow to improve the privilege. Our practice has been to compost it with muck or the refuse charcoal of a neighboring furnace. Coal ashes, sods from the roadside, or leaf mould from the forest will answer a good purpose for the base of the compost. We have also tried pure sand in composting, and when the manure is to be applied to clay-loam nothing is better.

Night soil is adapted to all kinds of crops. We have never known it to fail wherever applied. As it is the result of the decomposition of many varieties of food, so it contains the elements for the recomposition of many. As a nation we are beef consumers, even to a greater extent than John Bull himself, and as all flesh is grass, or mainly derived from grass, we might conclude the compost of night soil would be good for the meadows, and so we have found it. For corn and roots it seems equally efficient. It is so good for every crop, that we are at a loss to decide where its application is best. As so many thousands of barrels of flour yearly come down the Erie canal, into New England, and pass through the alimentary canal into the vault, we should suppose poudrette would be specially adapted for raising wheat; but of this we have had no experience. A prejudice exists in the minds of some against the use of night soil, arising from its odor, and a fear prevails that its presence in the soil will taint the growing crop. Nature's laboratory is too skilfully managed to give any occasion for such apprehension. Every pile of manure is a mass of filth and is full of disgusting odors, but placed in the soil, the living plant separates and sublimates the particles, with a skill which distances all science, and returns them to us, glowing with life, beauty and fragrance, every way adapted to supply the wants of man and the inferior animals. This resurrection of these vile particles, so purified, is analogous to the resurrection of which Paul speaks: "It is sown a natural body, it is raised a spiritual body; it is sown in weakness, it is raised in power."

Much night soil is wasted by not frequently coating the vault with some absorbent. Economy and health alike demand that this should be done. In warm weather especially it decomposes rapidly, and the gases, noxious to man but vital to the plant, pass off abundantly, unless retained by some absorbent. A frequent sprinkling of plaster or charcoal dust will save this waste. Muck, sods, sand or any soil will answer for an absorbent, and will serve as a deodorizer, so that the contents of the vault can be removed with less discomfort.

Another neglected source of manure is the hennery. We send vessels around Cape Horn to import the deposits of the birds on the Pacific islands, but think lightly of the equally valuable deposits of our domestic fowls. Distance lends enchantment to the view of guano on the Chinchas, while the home-made article seems too homely to be noticed. Fowls are high livers. Their bill of fare is meat and vegetables for the first course, grain for the second, and fruits for dessert. Their excrements are therefore rich, abounding in urate of ammonia and phosphate of lime, the two most valuable substances in manure. If exposed to winds and weather, much of the value vanishes into thin air. It doubtless comes back to the earth again in the rains and dews; but is more likely to fall on some neighboring farm or State than on the land of its rightful owner. It is not much less a mistake to permit the droppings of our fowls to lie under cover, but uncovered with some composting material. In this situation there is less waste from decomposition ; but we have found the dry excrement filled with vermin of various kinds that make their abode in it and feed upon it, and consequently diminish its value. It is wonderful to see the provisions which a kind Providence thus makes for turning all forms of decaying matter again into animal life, and keeping the air pure and the world full of the higher order of organized existence. We would not counteract this benevolent plan of the Creator, but rather be co-workers with Him, and turn all this vile, decaying matter, first into such vegetation as we may choose, and thence into such animal life as we may select. This is man's legitimate province, and herein he exhibits his skill. We have found the best mode of preserving the droppings of our domestic fowls is to keep the floor or ground under their roosts well littered with muck or earth of some sort. As both the solid and liquid excrements are voided at once, this litter is very essential for its proper retention ; and the quantity of the manure is greatly increased without much diminution of its quality.

We might speak of the hog yard as a manufactory of manure on a large scale, but we fear prolonging our subject too far ; and so much has been said on the capacity of the pig for working our manure, that a reformation has been effected in the management of the piggery. The hogs of New England are no longer the public scavengers, foraging at large, but are boarded at home, and in pay for their board shovel over the compost heap, furnishing their own tools. The barnyard and the barn cellar have also received greater attention and improved management of late years, so that there is little occasion for referring to these sources of manure. No good farmer now allows his cattle in winter to poach his fields in search of water and dry forage, but they are fed, watered and made comfortable at the barn, so that their droppings are not scattered from Dan to Beersheba, and half their food consumed in the search for it, and in keeping up their animal heat.

As the last neglected resource for manure, we desire to call attention to the refuse of our manufacturing establishments. Around most of these there is an accumulation of highly fertilizing material, which is often left to pollute the air, or thrown into the river to be wafted to a bourne from which it will not return in this generation. If we expect the agriculture of Massachusetts to keep pace in the march of improvement with its manufactures, we must avail ourselves more thoroughly of the fertilizing refuse of these manufactures. The hair parings, spent bark and liquids of the tannery, the shoddy and washings from the woollen factory, and the refuse of the soap-boiler are only instances of the undeveloped resources in this direction. The waste of the woollen mill, which even the shoddy manufacturer rejects, will raise the temperature of the compost heaps to bloodheat, and rapidly disintegrate the muck and sods mixed with it. We have had more experience with the waste of paper-mills, and cannot too highly recommend the refuse sizing which these mills furnish. It is the residuum, after the sizing or glue has been extracted from the skins of animals, and consists of hair, undissolved skin and small bones, all rich in the food of plants, too rich for direct application to the soil without first being diluted. Some twenty years since we noticed this refuse lying around the mills, a scourge to the neighborhood, and immediately made arrangements to try its powers on the farm. We found its virtues so great that we have been able to sell the bulk of the hay crop and still keep the farm up to concert pitch. We have uniformly composted it with muck sods or charcoal dust, and prefer to let it remain a year before it is used. We have applied it in the autumn, mainly as a top-dressing to grass lands. Fields thus coated in the fall, start early in the spring, furnish two crops of hay, and remain green till the severe frosts of winter. The luxuriance of fruit trees is so great under its stimulus, that we have questioned whether the great growth of wood was not at the expense of a crop of fruit. Both the skin and the hair contain more nitrogen than flesh, and as the hair decomposes slowly, they make not only a powerful but lasting manure. Much of the sizing of our paper mills is still thrown into the river. It decomposes so rapidly in warm weather, and the odor is so offensive, that the manufacturer is glad to dispose of it in the most expeditious way possible, and he does not look at it, as an Irishman once remarked, with the nose of a farmer.

We have thus briefly glanced at some of the neglected resources of manure, treating the subject from a practical standpoint, and giving mainly the results of our own experience. The subject is by no means exhausted. Our hills and valleys abound with leaves, bones, and other substances, concerning which it would be well to ask the question propounded to Ezekiel, "Can they live again?" We may not see the miracle which the prophet saw, but these decaying objects, now so loathsome to the senses, are all destined to assume new forms of life, and it is our privilege to aid in the transmutation.

Mr. Clement. I must say that the essay of the chairman has pleased me very much, and I presume it has every gentleman present. I was glad to hear him speak with so much emphasis against the monstrous waste of fertilizing materials which are swept from our cities and large villages into the rivers and ocean. The time will come in this country, though we may not live to see it, when there will be those who will be glad to save everything that can be converted into food for plants. I have no doubt of that. It is time now for us to begin to save everything which can be made plant-food. I was glad, also, to hear the chairman speak so strongly in relation to the value of peat meadows; and I was particularly impressed with that, for I have no peat meadow—no bogs to which I can resort; hence I have to buy. I purchased on one occasion half an acre, in order to cart the soil off, and I did cart it almost all away, and was well satisfied with what I did. Then, again, more recently, a neighbor wanted to cut the peat in an adjoining meadow, and I purchased the surface soil. There is a foot, more or less, upon the surface which is not peat; it has been frozen and thawed so many times that it is all pulverized, and we use that as a compost for manure, for absorption in the vault, in the pig-pen, and under cattle, and so on.

In this connection, let me say, that last spring I found myself with quite a lot of pigs on my hands, like some of my neighbors, and some one remarked that he found them about as profitable as female pups of an ordinary breed of dogs. But in order to make the most of them we possibly could, I made a pen under my cattle, and carted this surface soil from the peat meadow in there. I cleared up all the manure I could in June, and early in September we used one hundred loads more that was made in the interval in that way, by the droppings from the cows, horses and pigs, all worked together. The pigs would tear a load of this surface soil all to pieces in a day or two, and then we would throw in another, or two or three, sometimes ; and on a rainy day, we would throw in four or five loads. It was my intention to make a good cart-load—thirty bushels—every day. In September I ploughed some five acres of pretty good grass land, and dressed it with this manure which we had made in that time, and seeded it down immediately. It looked finely before the snow came, and I expect to get a good crop of grass there next year.

I have reflected a great deal upon this subject of manure, and I am very confident that we have all of us got to be more careful, or most of us, at any rate. I suppose there are some gentlemen who are as careful as they can be, or think they are ; and yet I apprehend they are not, after all. I think that none of us is quite so careful as he ought to be, in saving all these fertilizing materials.

Mr. Hubbard. I think we shall all derive great benefit from the essay which we have heard from our worthy chairman. It brings to my mind, what needs to be brought to the mind of every farmer in the Commonwealth—the great law of compensation that is forever operating. If we are continually taking from the lands of New England, we have got to supply that waste in some way. Well, if we will just consider the matter, and save all we may save that is taken from the soil of New England, and return it again to the soil, we shall obey that law of compensation, and supply the waste we have occasioned.

The gentleman has referred to one thing which brings up in my mind this idea : that not only may we save all that we take from the soil of New England, and return it again, and thus make it productive, but, in addition to that, we may save what is brought here from the West. New England is not wholly a farming section of country, but, as has been said, it is the great workshop of the country ; and we go to the far West, to those soils which are very productive, and which, as the chairman has said, do not need, at the present time, this compensation for what is taken from them,—we go there for much that we consume, and, as I have said, in addition to all we can save of what is produced by the land of New England, and return it again, under this law of compensation, to the soil, we can save these products that are brought here from the West and consumed in New England. If we can save that, and return it to the soil, we shall go on continually improving the soil by cultivation. It is often said that this is a hard, rugged and unproductive soil; but if we bear in mind this law of compensation, and return to the soil all we can of what is produced here, and also all we can of what is brought here from sections outside of New England, I think the farming of New England can be greatly improved beyond what it is at the present time.

This is an idea which should go forth, and which should engross the thoughts of the farming community upon this subject. We all know that we cannot take from the soil without returning to it something to supply the place of that which we take away in the crops; and if we will give our attention to the ideas that have been thrown out by the chairman of this meeting, and see to it that we save what can be saved, and return it to the soil, we shall do much towards promoting the interests of agriculture in our communities.

Mr. Smith. I am very glad to see so much readiness on the part of those who have spoken upon this very important question. It is broad enough to give occasion for an interesting discussion, for it may take in all sorts of manures—the excrements of our stock, the guanos, phosphates, and artificial manures of all kinds. Now, if we agree in regard to the different kinds of manure, I am afraid we shall disagree upon the modes of their application, for we are confined by the subject to no particular description of manure, but it may include everything.

It has been suggested by the essay before us, which is a very valuable one, as we shall all agree, that the strength of manure depends a great deal upon the food of the stock. That is an important consideration. I am often asked the question—"Which do you make the most manure from, your sheep or your cattle?" My answer is this: if you feed light food to different animals, you will have the same kind, the same amount, and the same strength of manure, provided you save it all. One great advantage in keeping sheep is, that we are more apt to save the urine, the liquids as well as the solids.

If we were as particular to use absorbents to save the liquids of our horned cattle, as we are to use bedding and absorbents to save our sheep manure, my answer is, we shall have equally strong manure.

Where I live, manure is "the chief end of man;" it is our "staff of life;" it may be considered, perhaps, what we live for. For what do we farmers do but to raise our grain and our hay to feed our stock, to make our manure, to feed our crops, to feed our stock—and so it goes, year in and year out; and the great, absorbing question with us is, what shall we do to make more manure? I hope that this question will be fully discussed by all present, that we may take it in all its branches, and be profited thereby.

The CHAIRMAN. Will Mr. Smith give us his mode of application.

Mr. SMITH. "Where doctors disagree, who shall decide?" the saying is. The Massachusetts State Board of Agriculture has adopted measures to provide for experiments to ascertain what is the best way in which to apply manure to different crops, but it has left out of the calculation the peculiarities of season, and a thousand other things, upon which the answer to the question in great measure depends. I am satisfied, that in most cases, the best way to apply manure is to apply it near the surface, yet a gentleman on my right ploughs it in to the depth of five, six, seven, eight and ten inches. You ask my own method. I am of opinion that we do not lose so much of the strength of the manure by evaporation as we have formerly considered, and as I have said, for most all crops, I put it at or near the surface. For my corn crop, I plough either in the fall or spring, the time depending upon circumstances. I am in favor of the fall, because the teams are in better condition, and I gain so much time, which is of great importance, with all we have to do in our short seasons. In the spring, I haul my manure on, and harrow it in two or three inches. I am satisfied that is the best way for the immediate crop, and for the crops which will follow that. My farm is so situated, that some parts of it, I do not think it advisable to plough at all. Those lands I keep in grass, and upon them I put yearly a deposit of compost manure; and I am satisfied that by so doing I receive the greatest profit from the grass that I could get. The quality of the hay is better than where we re-seed oftener. But upon other soils, which are more easily ploughed and more easily worked, I am accustomed to apply manure to the corn crop, and either seed after the corn, and then follow with grass, or perhaps grain.

Mr. Brown. In the first place, Mr. Chairman, I want to thank you sincerely for the texts you have given us in your paper—texts sufficient to keep us in discussion three days, and a profitable discussion, too. I think if we should devote the whole time to one topic, it would be the best thing we could do, and that is, the value and uses of peat. It makes no difference whether it is coarse or fine, I presume. I notice that Prof. Johnston and other chemists call it peat, no matter what its condition is—whether it is in an advanced stage of decomposition, or whether coarse enough to cut and burn for fuel—as it often is on the meadows. I think the hopes of a progressive agriculture in a considerable part of the State of Maine, in the eastern portions of the States of New Hampshire, Massachusetts and Connecticut, depend entirely upon their peat swamps, and the peat in the valleys between high hills, which is infinitely better than the peat of the bogs. You find low places or tracts of high land between ranges of hills, and there are the best deposits of peat to be found in the country. It has been accumulating for ages, thousands, perhaps millions of years, from the vegetable matter of the hills, leaves, decayed branches, dead grass, and all sorts of herbage; and at the same time that these have been decaying, some of the elements of the hills, the manures, I would say, are washed down into these low places, and you find a deposit from one to ten and twenty feet deep. There we get the best peat that is to be found anywhere; and that peat is manure itself.

Now, is not this worth carting on to your lands, which have been robbed of these valuable materials? Prof. Dana, says, in his Muck Manual, that he made experiments over and over again with pure cow manure and with peat, and the results were just the same. That is, not precisely the same, but so nearly, that they need no questioning; and they show us, that it is just as well to go to these peat deposits and take them up to our barns, or on to our lands, as it is to accumulate the droppings of cows, at a much greater cost than peat.

Now what is the result? I see a gentleman before me now who called my attention, two or three years ago, to a field of some fifteen or sixteen acres, as we were looking over his farm one pleasant afternoon, and asked me if I could see any difference in the vegetation upon the surface. Said I, "It is distinct to anybody. Any person who can see at all can see that here is a line just as distinct as can be. On the right hand the herbage is larger, greener, and has a different appearance from that on the left hand side. What has caused it? I suppose you have cultivated and manured that side more than the rest of the land?" "No," said he; "for thirty years that whole field has been manured and cultivated and cropped alike, as nearly as we could do it, and with the same rotation of crops—corn, grass and grain." "Well, then, what can have caused it?" Said he, "Thirty years ago I hauled peat from that meadow on to the right hand side of this field." I think he said about one load to the square rod. Thirty years ago that was done, and there was the evidence of it two or three years ago, and I presume it is there to this day. That peat was used in a crude state, although it was found equally excellent hauled up there, spread and ploughed in.

Then, as an adjunct to your manure heap, there is nothing equal to it. There is no other material which is so valuable. For instance, in the autumn, haul into your barn a quantity of peat that was taken out of the muck hole two or three months before, piled up, and the water drained from it; haul it into your barn cellar and make a large winrow of it in front of the droppings of the cattle, and then cover those droppings every Saturday with that peat, but do not fail to do it. What is the result? Once a week, (twice a week would be better, but once a week will answer very well,) you cover these fresh droppings, liquids and solids, with this black peat; the droppings are thoroughly mingled with this peat, and every spoonful of liquid is absorbed as it falls, and absorbed as it is warm, too, which is very important indeed, and therefore there is no odor in evaporation, or very little indeed, and your barn is just as sweet all the time as this room, although you may have a stock of twenty-five or thirty head of cattle. This is a result that can be shown in many instances in this town. You thus save everything. I would cut all the fodder, and have it fine. When you come to remove the pile, you can shovel it much as you would cut a large rich cheese. Take a good steel shovel, and cut clear through, and the mass is black as your hat, and rich as anything you can put in the ground. I agree with Prof. Dana, entirely. I am perfectly convinced of the fact, that two loads of peat, mixed in that way with the manure—making three loads, with one load of pure droppings—is equal to any three loads of pure droppings that can be preserved. I have not a doubt of it, from an experience of twenty years, with the most careful observation, and attending to the matter myself. Peat is the most powerful absorbent we have, and, next to charcoal, it is the best thing we can use to keep everything about our premises sweet and clean. As I said before, I hope this matter will be dwelt upon by everybody who speaks upon the subject of manures, for I repeat, I believe the hopes of a progressive and profitable agriculture in these three States, or in portions of them, depend upon the peat swamps which a kind Providence, as the chairman has said (I was glad to hear that,) has kept in store for us.

Mr. Clark. With regard to the application of manures, I perceive evidence of a diversity of opinion among practical farmers as regards the depth at which they should be placed. Some would plough in their manure four or five inches deep; others would place it at or near the surface. Now, I think in settling a question of that kind, which is one of the deepest interest to us all, we ought to study with a very critical eye the operations of nature. I noticed in one of our agricultural papers, a few weeks ago, a very singular expression, which contained, I thought, a great deal of philosophy, on this point. The writer said that he had been out West, and he noticed that the Lord raised much larger grass than we could, with all our skill, and the Lord never owned a plough, but did it all by top-dressing. That last phrase, "does it all by top-dressing," seems to me to contain a vast amount of practical philosophy on this subject. "Top-dressing" is the method of Providence, or nature, as we say. I think that manures placed near the surface are much more effective than if placed very much below the surface. My opinion on this subject has changed very much within the last ten or twelve years. I used to be in the habit of ploughing in manures, and the deeper the better, I thought; but I find they did not do anything; I seemed to lose the whole; and for the last few years I have been in the habit of placing them in very near the surface, harrowing them in, or, if I plough at all, ploughing very lightly indeed. I think the chemical operation by which all our vegetables are grown takes place just at the surface of the ground. There is where the air, the rains and the dews act most effectively—right on the surface of the ground; and I believe that a tap-root, like a carrot or parsnip, does not so much draw its nurture from the deep soil below as from the surface. I believe that there is where the process is going on that drives the root down, because there are no little fibres about these things—or ought not to be, where they are raised as they should be—to draw nutriment from the ground, as we say; they are almost entirely smooth, and the smoother we can get them, the better. If they grow at all, it seems to me the process of growing must be carried on at the surface, between the top and the commencement of the root, and it is there where the manure needs to be put. But in raising an elm, we do not want to do that, for the elm has a large top, and the roots run a great distance; though there may be this same chemical action right at the surface also, (and I presume there is,) yet its roots, nature teaches us, draw much of their nutriment at a distance from where this chemical action is going on. My own impression is, that we lose much of our manures by ploughing them in deep. When I came to Waltham, eighteen years ago, I bought twenty-five acres of land, which was not worth anything. It had been occupied by the Lyman family a great many years, and would not bear anything but sorrel, and not a great deal of that. I do not profess to have been much of a farmer, but I have purchased a thousand bushels of grain a year, for the last ten years, to be eaten by my stock; and in addition to that, I have purchased from two to three hundred cords of manure, besides all I have made myself; and now I can raise a thousand bushels of vegetables with the utmost ease, on land that would hardly bear sorrel eighteen years ago. I had a very good crop of corn this year. I do not profess to come up to the farmers of Concord, who speak of raising a large amount of corn to the acre, but I had two hundred and twelve well packed baskets of corn from less than two acres of land this past season. That is no great amount, but it is something more than is usually raised throughout the Commonwealth of Massachusetts. I think, therefore, that we need to do all we can to make manures, and when we get them, to apply them with the utmost care and discrimination, so as to lose nothing that we get. They are too valuable to be lost, and too valuable to be misapplied.

Mr. HUBBARD. It has been said by Gov. Brown, that there is nothing which requires so much skill as managing a farm, and he has alluded to our muck beds. I wish to ask him one question. Supposing the soil on which he wishes to use his manure is a dark, heavy soil, inclining more to clay than sand, which would he prefer, sand or muck, to mix with the manure to go on to the soil I speak of?

Mr. BROWN. I think that on a granitic soil, generally, I should prefer a certain portion of sand; and yet my experience has been, that even on heavy granitic soils, with clay underneath, the muck has worked to a charm—admirably. There are lands lying near here which would, I think, illustrate that remark. On uplands that are moist, such as we call "runs" in New England, I should rather have a top-dressing of what we find under a granite surface frequently. It is not trap sand; it is flint sand, perhaps mixed with a portion of clay. I should greatly prefer that as a top-dressing. But on sandy loams, and on decidedly sandy land—that is, eighty per cent. of sand—I should want clay, too; but I should begin with peat, until I had got the sandy land colored somewhat, and then, unless clay cost too much, I should certainly add clay. It is really wonderful what may be accomplished with sandy land by the application of a portion of clay.

This discussion is so interesting to me, and so valuable and important as regards getting a good living in this world, that I never know when to stop talking when I get upon this subject. I believe we can enrich any land without applying a spoonful of manure; the atmosphere is at work for us all the time.

Mr. HUBBARD. I speak of this because I know many farmers who have gone to sand holes for the material to make a compost that is better fitted to the kind of soil I spoke of than muck, and they have obtained better results from the sand.

Mr. Brown. Yes, sir. That land is supplied with vegetable matter already, and they apply sand or silicates.

Mr. Thatcher. I think we are better provided, up in Berkshire County, with these muck beds, or peat beds, than some other parts of the State, on account of our lying between elevations, where have been formed, I think, as Mr. Brown has said, our best peat beds.

There are different ways in which we can prepare peat, and some very simple ways, perhaps not thought of by many. We have now arrived at that point where most of our farmers have underground cellars to their barns. Years ago, when I commenced farming, we did not have these cellars, as we do now. Our stables then were on a level with the ground. Perhaps people now have their stables in the cellars, and do not use, as they may use, this muck to save the urine in their stables. It has been my practice, for twenty years, to take up, twice a year, the floors where my cattle and horses stand, unless those floors are over my cellars, and dig out under them to the depth of two or two and a half feet, filling up under these floors with this peat muck. I remove it in the fall, and also in the spring; at any rate, twice a year under my horses. The cattle not being in the stable so much in the summer, it is not necessary to remove it in the fall under the stable where the cattle are. I can call to mind an instance where I put some of this muck that had been lying under my horse stable six months, upon a a piece of grass land, and after I had put it on it looked exactly as if fire had run over it and burned the grass, the muck was so strong, with nothing but the urine from those horses. I put this dressing on after I had taken my crop of grass from the ground, and the next year I had a very heavy crop of grass. I have never experienced any difficulty, and certainly the strength of this muck showed me how much we lose in not using this means to absorb these droppings.

Where I now live I have none of these muck beds, but I have them within about a mile of me, and I have made a contract, within a week, for a year, to draw muck from there, at twenty cents a load, and I expect to haul a large amount this winter, where I can get at it next summer.

Then we have had, near where I now live, a lake, which has been a reservoir, but the dam has been raised, so that it is spoiled now; but some twenty-five years ago, when the water was low in that reservoir, we dug down to the depth of eight feet, drawing off the muck, until we got to what we call there, marl, which consisted wholly of fine shell, which may be found in very many parts of the muck beds; if you take a spoonful of it, and throw it into a basin of vinegar, it will cause an effervescence equal to saleratus. We hauled that off and put it upon the land without any mixing with manure. I know that twenty-five years ago, we drew a large quantity of that marl, and put it on the south side of an orchard, and I think if I could take gentlemen there next summer, they would see a striking difference, notwithstanding twenty-five years have passed since the application was made, in the appearance of that land over the adjoining lands. It was a heavy loam, but it made that land light to work, and we. have received the benefit of it down to the present time.

With regard to the application of manures, we may differ, and shall differ, according to our locations, the same as we do about ploughing. Mr. Clark spoke of the elm. I think the corn crop would differ from the carrot crop the same as the elm differs from the carrot crop. There is a growth, which must be a growth of the root, to sustain the stalk running up, which will descend to gain strength to support that stalk, which will give me to understand that I want to put my manure at some depth on that soil, in order that those roots may have a vigorous growth. I do not believe in ploughing deeply for corn, and covering my manure deep, with nothing to make the corn start in the spring; but if I can have the manure there, so that when these roots start, they shall reach it, and thus gain strength to sustain the stalk during the high winds we have, I think I gain something.

Mr. Clark. Do not the roots of corn come very near the surface of the ground?

Mr. Thatcher. Yes, sir; but you will find that they also extend very deep. If you plough up the stubble, you will find the roots extend down six or eight inches, I think, without any doubt at all.

Mr. Ward. I am situated on a farm sloping to the east and to the south. At the foot of the descent is a basin of some twenty acres, which undoubtedly was once a pond. In that basin is a peat bed, I can't tell you how deep, for I never have found the bottom, although we have oftentimes dug down several feet, and have never reached the bottom of the peat. There is also on the farm a hill of sand. They are both very convenient to the barn, and to our stables. I have in former years been more in the habit of using peat than I am at present. In the fall of the year, after having cleaned out my cellar, which is forty by sixty-five feet, I cart into it perhaps sixty or seventy loads of just what I please to put in, and I please to put in sand or muck, according as I am going to use the manure on one portion of my land or another. If I am going to put it on stiff or low land, I cart in sand; if I am going to put it on my light land, I cart in muck, and I put some in my yard where I herd my cows. But I have turned my attention more, of late years, to manuring my low lands and turning my uplands into pasture. My practice in manuring is this. In the spring, I take off the top of my manure heaps, and place it upon my planting ground. I do not plant so much as many farmers; I do not receive that benefit from the use of the hoe that many farmers do. I usually put on my planting ground some thirty cart-loads to the acre, and our carts usually hold from twenty-five to thirty bushels. My former practice was to plough it in rather deep, but I came to the conclusion that I did not reap that benefit from the manure that I ought, and therefore I now lay it nearer the surface. As time has progressed, I have been laying it nearer and nearer to the surface. I am now getting out of the way of the hoed crops, for the reason that I cannot make them pay, and I have this fall laid upon my old fields—fields that have been cultivated fields, that bear what we term herdsgrass or timothy—about as much manure as I would if I was going to plant corn. I think I shall receive more benefit from my manure in that way than from a hoed crop. Root crops I have nothing to do with; they are a hoed crop, and I cannot make them pay.

My cattle stand on each side of the barn, my driveway goes through the centre, and I have a leanto on each side. I have often noticed in the spring, when I have had sand in the cellar through the winter, that the liquids that have passed down through the floor have so saturated that sand that it is discolored clear to the centre. Although it may be clean, good sand when it is carted in there, when it comes out it is all discolored; and oftentimes I find a puddle of urine that has worked out from the manure heap in the centre of the cellar. Now, when I prepared my cellar, I cemented the floor, and there is no leakage, and the liquids are all retained. I value the sand that is filled in that way quite as highly to go on my low lands as I do the droppings from the cattle.

There are various ways, as has been suggested, in which the farmer may increase the quantity of his manure. I was rather surprised myself, this last season, at the effect of certain manures upon the ground. I ploughed up a piece of ground of about two acres, and carted on about thirty loads to the acre, and at planting time I took the hen manure that had been made during the year and dropped it into the hill—perhaps as much as a man would take up in his fingers. What my hens made during the year carried me over an acre of ground, perhaps. When we came to use this hen manure, I put in three rows of potatoes through the field, and planted the rest of the field without anything in the hills; but the field otherwise was treated all alike. Upon gathering the crop, we estimated that we got sixty per cent. more where the hen manure was put than where it was not put. You perceive it was a very great increase in the crop—altogether from the use of that hen manure. That might have been increased in quantity, as suggested by the chairman, by scattering loam or something under the hens at the time of the droppings; but there was a query in my mind, when the remark was made, whether it would be any essential benefit. We should be simply carrying dirt to the hen-roost and carrying it back to the field, and it would require a greater quantity when the manure was put on, so that we should lose the transportation. All the good qualities of the manure were retained in it, and we could not get any more than that by putting in the dirt.

All the manure that is dropped by my cattle and horses goes directly into this cellar. I am not in the habit of housing my cows in summer; I let them lie in the yard, where they have shelter, and there they make something like a hundred loads of manure during the season. That goes to my grass, also, and my hog manure I put upon my cornfield. I think that is far better than what we could make at the barn for increasing the growth of the crop. It is a strong manure—made from better substances.

Mr. Clement. There is one other subject about which I wish to make an inquiry. It is in reference to gas lime. It is simply oyster-shell lime, through which the gas has been strained. It has a very offensive odor, and is very powerful in something poisonous. I do not know whether it is worth carting. We can buy this in the city at a merely nominal sum—a cent or two cents a bushel. I have used a thousand bushels one year. I spread some of it on grass land, and my man was not sufficiently careful when he distributed it, and some of lay a little too thick and killed the grass. If you throw a little round bushes it will kill the foliage, and if you pile up a heap of it, it will kill the foliage on trees twenty feet off, on the side next the heap. There may be some gentleman present who can give some light in relation to that, so that we may know whether to use it or not. I have not tried enough experiments with it myself to enable me to determine accurately whether it is worth purchasing and carting it out of the city three, four or five miles.

Mr. Thatcher. What is your idea?

Mr. Clement. My own idea is this. I don't think I derived much benefit from it where I spread it upon grass, but I did derive benefit from it upon land planted with potatoes. I should say seventy-five bushels is an abundant dressing for an acre; and you see the expense is but slight. I thought the potatoes were better, but I tried it only one season. Of course one experiment of that sort will not enable any one to determine accurately. I would not say, distinctly, that it was a benefit, but I think so. I will say this, also, that in working the soil since, I frequently turn up a little lump of this shell; it is now pulverized; it is not shell. It is not much pulverized at first; there are a good many shells, at any rate, but these soon crumble to pieces. I have certainly got the impression, from my reading, that oyster-shell lime was valuable in many respects as a dressing for crops; and I had hoped that I might hear from some gentleman present who had had a larger experience with it, who could give us the details, which would enable us to determine more accurately in relation to the value of it.

Mr. Smith. A neighbor of mine was accustomed to use this gas lime for quite a number of years, and I had the testimony from him that he used it with good success. He used to apply it to his corn lands and to his grass lands, being careful to spread it thin, as my friend Clement has mentioned, because it will destroy the grass if applied in lumps. But he does not use it now. I was induced through his influence to purchase a quantity of it, four or five years since, because of its not costing much, and put about a cart-load of it upon an acre, but I have never seen any advantage from it. I am of opinion that I either applied too much, or else it is of no benefit. I am of opinion, and I have heard the same opinion expressed by others, that no benefit is gained by the passage of gas through the lime; that if there is any advantage in it, it is because of the lime nature which it contains, being oyster-shell lime.

Mr. Clark. About six years ago, the gas company in Waltham offered me a large quantity if I would take it away. I thought they made me a grand offer, and sent my man over and got a large quantity, and put it on my land; and that is the last I have seen or known of it. I don't think it does any great good.

Mr. Smith. One of my neighbors put it on a piece he was going to sow with onions, and I tried it myself, and neither he nor I were able to obtain any onions, because it was so strong that the seeds would not germinate. I did not put it on so bountifully as I did on the other piece.

Mr. Thompson. I have seen this gas lime tried for a number of years, and the operation of it was injurious to the land. The only use made of it in our place is to put it on roads to make them hard; it is very fine for that. We have composted it with different kinds of material, but never found any good effects; it has always been more or less useless or injurious.

In listening to the gentleman on my right (Mr. Ward,) who spoke about discontinuing the use of peat, and taking up the use of sand, as a material for composting in his cellar, it occurred to me that if he had used his peat in the proper places, he would have had good results; although I would use peat myself anywhere as a compost with manure. As Mr. Brown said this morning, I would rather have two loads of peat mixed with one load of clear excrements from the cows, than have three loads clear from the cows. It may be that we would apply the cow manure too thickly, and thereby it would be injurious to the crop; or, if you put the cow manure very near the surface on ploughed lands, if it is very rich, not composted well, you will find it will dry up, and there it will lie inert, and your crop will be very little benefited by it the first year, at any rate.

It seems to me that this use of sand is only the loss of one carting. If you cart it into your barn cellar, you have got to cart it out again, and we all know sand is pretty heavy to cart. It may be an absorbent, and may be beneficial, but we find in our neighborhood a yellow loam that is immediately below the surface of the pure, white gravelly sand, two or three feet, and cart that on to our meadows, and it is almost as good as manure. I have driven by, all summer, two lots, belonging to one man, one of which he manured with barn manure, and the other with sods, which he stole from the waste land—of which there are thousands of acres in the neighborhood. They are grand mowing lands, and on one he carted this poor, sandy soil, which is on high lands, which you would think would not support the grasshoppers, and he had as good a second crop upon that piece as he did upon that next to it, which he dressed with barn manure. If that be a fact, what is the use of carrying the soil into the barn cellar and then carting it out again? I would cart all but very rich sods in as absorbents, but I don't think it is of any great benefit to cart sand into a barn cellar. I would put it upon the meadows without carting it in; then I would compost my manure with peat muck, which is valuable in itself, and if I had any high land, put that on, and it will produce as good a crop exactly as if it was all clear cow manure. For instance, I have in my mind a spot of land of half an acre, that three years ago was barren sand. Right below it, ten rods off, is a peat hole, in a very beautiful mowing lot. The man digs some of that peat out every year, and carts it across the highway upon this barren sand to dry, and that lot, in three years, has come into mowing, and gives a good crop. Nothing in the world but muck has done it. That strikes me as evidence that peat is very valuable. I think it is the best material to compost with that I have ever seen. My method is to collect the peat and compost the sods and seaweed from the first day of January, to the last day of December. I am satisfied that by next spring, I shall have made six hundred loads. I have carted seaweed when a man could do but little else but cart seaweed. Well, I bought a farm that had been partitioned off by fences into small lots, and those fences I removed. The old custom always was to plough toward the fence, and of course it has made ridges three feet high and five feet wide. When I removed the fences, and made the lots in a different shape, these came right in the way of the mowing machine; and if I undertook to plough, they would be very poor places to plough over. Consequently, I have hauled them off into the hog-pens and the barn cellars. This fall, I have collected hundreds of loads of sods from those ridges into a heap, to have it ready when I want it hereafter; for we all know that for many vegetables and plants, and grape-vines, rotted and decomposed sod is the very best material that can be found—much better than any manures. For strawberries, I know it is better than any ammoniacal manures.

It seems to me, from my experience, that farmers should always be collecting everything in the nature of manure. I throw but little peat into my hennery, but I have the manure taken out frequently and composted with peat and covered peat over it, so as to save it all. I do the same with the contents of my privy. It is about seven feet long by twelve feet wide, and so placed that everything runs out of the vault but the solids; and therefore I throw in peat every little while, and once or twice a year it is taken out and composted. I make every year enough to manure a whole acre of land—as much as I should have to pay fifteen dollars for if I bought guano. You can make ten dollars worth of manure a year from twenty-five hens, if you have the peat or good rich sods such as I have to compost with it. We all know that if we can make a load of manure, twenty bushels, it is worth a dollar or a dollar and a half; and we know that if we do not have this manure we have no vegetables. The gentleman spoke about root crops. Of course we want to raise a root crop and a hay crop, and that is about all. I can buy corn cheaper than I can raise it. I can raise roots equal to nine tons to the acre—certainly that is a paying crop—when I can raise but three tons of hay to the acre.

My roots have cost me nine cents a bushel, and they are certainly a valuable crop. But unless you manure well you do not get a root crop. You want to plough first and then put the manure on, two or three inches below the surface, then plant your seeds immediately, and you have the effect almost instantly upon the seed as it germinates, and it does not seem to lose that growth. There is a stimulus in it when it is so near the surface. The light and heat of the summer sun are acting upon it and the surface soil to such a degree that you have a thrifty growth of leaves all the time. I have grown ruta-bagas this year on a piece of clear sand that has accumulated on the south side of a fence until it is four feet high the whole length of the fence. I ploughed there and put on a good coat of manure, and I have had ruta-bagas six or seven inches in diameter this year.

Mr. THATCHER. Will you be kind enough to state how much stock you have, to make those six hundred loads of manure?

Mr. THOMPSON. Twelve head of cattle, three horses and about twenty hogs—that is, grown hogs and pigs growing all the time. We have carted in everything we could get hold of; everything that would be called refuse round the barn and farm.

Mr. THATCHER. I must say, that if the statements are true that have been made here this morning, in regard to the quantity of manure that may be made, we farmers who are outside the peat bogs are exceedingly unfortunate. It does seem to me that the question is, not the quantity of manure that we make, but its quality. I know that it has been stated here, by pretty good authority, that one cord of solid excrement from a cow is worth no more than one-third of that cord, composted with two-thirds of a cord of peat; but it seems to me, if I were offered my choice between a cord of solid excrement from a cow stable and a cord of manure composted in the way I have spoken of, I should prefer the former. I know this much, that for all heavy crops that are raised, at least in our part of the country, the less there is of compost about the manure the better. I do not want my manure composted if I am going to raise a big crop of anything; I do not care how near it approaches the solid excrement. I never have found the trouble to which Mr. Thompson alluded, of its drying up when it is turned into the soil. The idea suggested by Colonel Ward was significant. He said he might have made more manure from his hennery—he might have increased the quantity—if he had been so disposed, but he did not think it worth while; he thought he should not get anything more by putting loam in there and carting it back to the field, than he would if he carted the manure out without it.

Mr. Slade. Mr. Thompson tells of making six hundred loads of manure from the amount of stock that he keeps. I keep about half as much stock, and I cannot make three hundred loads of manure; if I make one hundred loads of what I call manure I feel pretty well satisfied. I know I have neighbors who make twice as much manure from the same amount of stock, but it does not tell on the growing crops; and my idea is simply this: that farmers perform a great amount of labor which does not pay them, in carting in and carting out. Now the use of Peruvian guano proves very conclusively that it requires but a very small quantity of the right kind of manure to produce a crop. Take three hundred pounds of guano and scatter it over an acre where you sow rye and oats, and you will see its effects immediately and magnificently. How much of that guano lies on a square foot of the surface? Now, to produce similar results from a compost heap, a man must take a team and work all day, and then perhaps he will not do it.

During this discussion, a conversation occurred to me that I once had with a very intelligent gentleman in Bristol County, a very extensive raiser of premium crops of corn—Mr. James Leonard, of Taunton. For quite a number of years he has competed, and always successfully, for the first premium on a crop of corn. He has succeeded in raising one hundred bushels to the acre. He has raised two hundred and ninety bushels to three acres, and has never entered for a premium when he did not raise over ninety bushels. Some neighbors of his, in an adjoining county, with a better soil than he had, were very anxious to raise as big a crop as he did, and tried it year after year, without success; and finally, two years ago, one of them came to Mr. Leonard and requested of him the secret of raising his corn. Well, he told him just how he did it. Said he: "Your land is as good as mine, if not better; I use so much manure to the acre; I plant such a kind of corn; and my mode of tillage is thus and so." "That corresponds," said the gentleman, "with my mode, and I don't understand why I can't get as good a crop as you do." Well, he told him he didn't know. A year ago last spring he was invited to go over to one of the Bridgewaters, where the experiment was to be tried for a premium crop. As soon as he got there, he says he told the gentleman: "The secret of your failure is simply this: it is not in the kind of corn; it is not in your mode of culture; but it is in the manure to which you resort to carry that crop through." Said he, "You make your manure; it is made from the droppings of your cattle and what you put into it. What you put into it is not manure. I buy my manure; it comes from such a stable in Taunton, and there is nothing in it but the droppings of fatted cattle. You use just as much as I do, and when you will use the same kind of manure you will produce just as big a crop of corn as I do." I believe that.

Mr. JOHNSON. I am one of those fortunate individuals who can agree with almost everybody here, and it is because my soil is so varied. I perfectly agree with the idea advanced by the last gentleman who spoke, and also with Mr. Thompson.

If I could have all the sand that I would like in my compost heap for my clay soil, I would have at least one-half sand, and prefer it to the manure. I have tried manure upon that clay bottom, spreading upon the top, side by side with it, clear sand and the washings of the road (which was sandy,) which had been collecting for years, and which contained a mixture of vegetable matter undoubtedly, which had collected there, and made a black deposit. I spread that upon that meadow (as we will call it,) and more grass was grown from the application of that soil than we ever got from the application of compost from the manure heap. Not more than a fifth part of that compost heap would be the collections of the soil. Yet it grew more grass and it lasted longer than the manure did. Now, I proposed, a week ago, to buy an acre more of that sand, to cart on that meadow this winter, and I would rather have it than to have stable manure to go on that land.

Then, again, if I am going to cultivate any class of soil that we have, I prefer nearly clear manure. I do not want to cart the dirt from the field, and run the manure through it, and then cart it all back again. I see no sort of use in it, except to hold the urine; and that is sufficient; there we get a good mixture. But in the other case, I want the sand; I don't want the clear loam. There is some property about the sand which produces grass there. So that I can agree perfectly with the last speaker, and with Mr. Thompson.

Then, again, we cannot tell exactly how much dirt or sand to mix with the manure until we see the soil; then we can judge pretty nearly how to mix it. That seems to me the only safe way. As my friend Clement said, this discussion is to go out to the public, but it decides nothing. Can we decide anything? I do not see how we can decide anything, or settle the question how deep we are to plough, how much peat it will do to put into the soil, or anything else. I have no peat. My neighbors have it, and have used it pretty extensively, but they have left off using it now, the expense of carting has got to be so heavy. We have to pay two dollars a day for labor, and it costs so much to cart the peat that they have given it up. It is used mostly for orchards. One near me, consists of two hundred and fifty trees. They have been in the habit of tipping up peat on that ground, and now it is stocked down with clover, and produces very heavy crops. It has had no manure whatever for twenty years.

Mr. Smith. I wish to make a statement to correct what I have said before. I think I said I applied gas lime to one acre. I should have said two acres instead of one.

Mr. Davis. I merely rise to corroborate, so far as my opinion goes, some of the remarks which have just fallen from Mr. Johnson. It seems to me that the more important question for us, in regard to manure, is, the kind of manure that is to be applied to particular soils. I merely wish, in that connection, to state my experience upon that matter. I have a peat meadow, where the peat is some twelve feet deep. A few years ago, when a portion of it was laid down, being ploughed once, I put some gravel upon it, and got a heavy crop, which in two or three years fell off into fine, very thick set meadow grass, without stamina, very hard to cut; it could not be cut by the mowing machine, on account of the fineness of the grass and its want of stamina. I thought this want of stamina was entirely owing to the want of silicate in the soil; and in order to test the matter, as far as I could, I last year put on a heavy dressing of green barn manure. That added, of course, to the growth of the crop, but the same difficulty was found to exist this year. It was fine, and hard to cut. I have now covered it with fine sand, which I think will be of more effect than manure, for land in the condition which that is in.

It seems to me, sir, that that point, the application of the proper manures to particular soils, and the application of various soils as manure to other soils—is one that is not sufficiently dwelt upon by us, or sufficiently considered by farmers. I have had the same experience as Mr. Johnson in regard to putting peat upon uplands. I find it is better to put on even the poorest peat, and let the sun and air act upon it, rather than not put on any at all.

It seems to me that something might be said with regard to the formation of compost heaps, so universally recommended. I know it is dangerous to say anything which may be misunderstood, with regard to composting, but I think the matter is generally misunderstood. My experience with regard to compost heaps—I mean, composting barn manure with peat—has led me to the conclusion that it is altogether useless work; that with the present cost of labor in this country, and more especially in this portion of the country, it does not pay. I have come to the conclusion, that next to top-dressing, which on most soils is the cheapest mode of manuring, the application of green manure, ploughed in, and peat ploughed in, leaving the composting to be done by the action of nature, is just as effectual as the formation of compost heaps, with the recommendations of which the agricultural papers are filled. It seems to me we do not discriminate enough, and that one-half the compost heaps recommended are a mere loss of time.

Adjourned, to meet at 3 o'clock.

AFTERNOON SESSION.

The Board met at the hour appointed, Mr. Hyde in the chair, and the subject of Drainage was announced as the topic for discussion.

DRAINAGE.

Mr. Brown. As I hinted this morning, in some remarks which I made here, this subject of drainage is one of great importance to us as farmers, and one of exceeding interest to everybody, whether farmers or not. We have with us a gentleman who has had a great deal of experience in laying drains, and who has written a work on the subject which I think most of you may have read with pleasure and profit, and I would be very glad to have him speak upon the subject. I refer to Judge French.

Henry F. French, of Concord. Seeing the subject of drainage announced, I came in, hoping that I might gain some information, as I have recently recommenced my agricultural life by purchasing a farm in this neighborhood. I was not aware, until now, that I should be called upon to speak. I have no objection to talking upon the subject, because, as has been said, I have given to it a great deal of attention, both theoretically and practically. When I went to England, ten years ago, I was charged by the person who then had charge of the Agricultural Department at Washington to collect information upon that topic, and I went out of my way a good deal to make the acquaintance of drainage men in England, engineers and the like, and to visit the best specimens of drainage that could be found in Great Britain. Since then I have been constantly at work upon the subject. I have always owned land, and have constantly been practising. It is a subject that one can hardly be expected to take up in a general way; and if any gentleman will suggest what particular topic connected with drainage he would like to hear discussed, I should be very glad to be directed in that way.

Mr. Brown. I think the first thing we need to know in regard to drainage, is what kinds of land need drainage? Some persons say, if you drain a sandy piece of land, you not only do it no good, but harm. I think that is a very important question, at the outset.

Mr. French. Some people, I think Horace Greeley is one, are of opinion that all lands would be benefited by draining. I am inclined to think that is not so. Where no stagnant water stands during the whole season, that land would not be benefited by drainage. Any land, in which water stands at any season, stagnant, within two or three and a half feet of the surface would be benefited by drainage, somewhat. One of the chief advantages is, that you lengthen the season. I am speaking of New England, where the season is short, and we have not time enough to do our work. Whenever your land is wet in the spring, whenever you are late in ploughing, your land is benefited by giving you additional time. I had a piece of land in Exeter, N. H., lying on what looked like upland—a springy hillside—so wet, that cranberries grew and ripened there every year. That land, on which no crop would grow, I drained four feet deep. It was sand and clay, mostly sand, but coming down to clay after awhile. That land is now some of the very earliest in that part of the country. The effect of drainage upon land of that character is very valuable. The water is not only taken away from the surface, but it is taken out of the subsoil, so that land which has been wet and miry heretofore, will be dry as early as any land you have;—not, perhaps, so warm as sandy land, but as early, and that is a great advantage.

Now, besides the merely mechanical effect of composting the soil, and making it so you can work it, you gain an advantage in another way, in the warmth of the soil. You know perfectly well that heat does not go downward in water. You cannot heat water by the application of heat to the surface, in any way. You may put a hot fire over a vessel of water, and keep it there until the water evaporates, and you will not warm the bottom. Heat is propagated in water by the movement of the particles. You warm it at the bottom, and the heated particles rise, and the cold ones fall. Two particles of water do not impart any heat to each other by contact; it is merely by motion that heat is propagated from the bottom. Your soil, being full of cold water in the spring, of course you may have ever so hot a sun upon it, but no heat goes down; you may have a warm spring rain, and it may lie on top of the ground, but it will not warm the water in the ground; it cannot; there is no motion there. Whereas, if you have an under-drain, four feet below the surface, when the winter begins to break up, the cold water falls and goes off, the warm water that comes down in rain takes its place. You lengthen your season in that way, and you will find that an advantage in every respect.

That, perhaps, is not a direct answer to the question that is suggested, What lands require drainage? but it suggests that a great many lands that are ordinarily not thought to require drainage will be benefited by it somewhat. Of course, it is not always advisable to do it. It is often a question whether it is worth while to drain land, upon which you can raise a crop of grass, for the purpose of putting in other crops. There is a great deal of low land that will yield a very heavy crop of grass, that is not fit for corn land or for market gardening. But if you want to put in corn, or make a market garden, you can do it. You can drain that land and drain it so that you can plough it early. Whether that land requires drainage, can be answered by asking another question, "What do you want of it?" Whether it will pay or not depends upon the locality of your market and the value of your product.

In all land that you desire to plant for corn or for market vegetables, the water should be out so that you can work it in the spring as early as any land can be worked, and so that it will keep dry until it is frozen, so that you can go on with cattle and horses in the fall. Upon the point, whether drained land freezes more or less than land undrained, I will say that I have no doubt that drained land freezes deeper than land not drained; and for this reason. Land that is wet is ordinarily supplied with water from springs, and springs are warmer than snow. That is, they are above the freezing point, and they generally keep those swamps and springy land from freezing deep. If you take the water out four feet deep, very likely the frost will go much deeper than formerly. But one thing has, I think, been fully ascertained, that the frost will come out of drained land much earlier in proportion to the depth of frost, than undrained land. Undrained land freezes much more solid, there being a great deal more water in it, than drained land, and it takes longer for it to come out; and besides, immediately, when there is any movement of the water below, the moment there is any thawing, it thaws at the top and bottom both, and usually the water will be out at the bottom as soon as it is out at the top. I am speaking now of lands that are not springy. There are lands so full of springs that they remain comparatively open all the year. In fact, many swamps do not freeze at all.

Mr. FLINT. There is a question I would like to ask Judge French, now that he is up, in regard to the most economical method of side-draining in low, marshy lands and wet meadows. I suppose it is generally considered that an open centre ditch is the main thing, but it often happens that in addition to that it is necessary to have certain side ditches, so as to lead the water at a distance to the main drain; and in order to avoid inconvenience in ploughing and handling the land, it is desirable that these side ditches should be covered, if possible. Now the question in my mind is, how we can most economically construct these side ditches to lead into the broad, open ditch on a wet meadow. Supposing a man had a sufficient quantity of large flat stone, as is the case on the formation which geologists call gneiss, near at hand, which can be easily handled, and which sometimes a man wants to get out of the way, would it be practicable or economical to lay these flat stone at the bottom of a ditch, supposing it to be of soft mud, and then set up stone edgewise, one upright and another leaning obliquely upon it, the way we naturally would in building a drain? Whether there would be much liability to sink; whether that method would be practical and economical as compared with the attempt to lay tile drains; or, if tiles would be better, what would be the best way of laying tiles under such circumstances; whether they should be laid on scantling or not, or in what other way, so as to secure their permanent efficiency?

Mr. French. My first proposition, in answer to the inquiry, would be, that I would never use stone if I could get tiles at a reasonable price. I never would use stone on my farm if I could obtain two-inch tiles for $15 or $16 a thousand, delivered. If the stone lay on the ground, I would haul them away and use the tiles instead. I could demonstrate to any person who would give me his time and follow my mathematics, that it is cheaper for him to pay $16 a thousand, or a little more than a cent and a half a foot for the tiles, than to use the stone that are lying scattered on the field; that he can pick up the stone and take them away cheaper than he can open ditches, lay the stone and cover them in, because the labor of excavating a ditch for a stone drain is more expensive than the whole expense of excavating and putting in tiles, and the labor of laying stone is much greater than that of laying tiles.

Mr. Flint. That would be the case on hard soil; but on peat soil, you would have the material, which you would want to use. That objection would not hold so strongly where the farmer wanted the material for top-dressing.

Mr. French. I think a person accustomed to use a mowing machine would avoid all open ditches, if he possibly could. I think nobody who has had any experience in ditching would leave an open ditch, if he could have the surface smooth. There is once in awhile a large meadow where you are obliged to have an open centre ditch ; but it is not often that there is a place where five-inch tiles, or two perhaps, laid side by side, will not carry all the water off. It is not often, therefore, that you are obliged to have an open ditch. All this land which lies full of open ditches, can be covered up as even as this floor. You had better take up the earth by the shovelful, from the general surface, than dig it out of the ditches.

The way I would drain is this. In the first place, get a centre ditch through the middle of the lot. That may be an open drain, if you cannot do any better. Then you want to run your side-drains up the slope, without much regard to anything else. Don't undertake to cut off the water as it comes down the hill, but run into the hill ; then you are always lower than the water. Have some regard to system, because you want maps and charts of your drains, so that you can find them. Use tiles, if you can get them. I have generally put in a board at the bottom where the ground is soft. You will avoid this necessity, if you can strike the bottom of your peat, as you generally can by going four, five or six feet deep, and by getting one drain below the bottom of the peat, you will sink the whole meadow so that it will be compact enough to bear your tile. But I have never seen any land so soft that tiles would not lie well enough upon a board six or eight inches wide. You can use any kind of old boards that you happen to have, put them in in that way, and cover them up. The objection to using stone, besides the expense, is, that you cannot make perfect joints, especially in land that is soft ; you will leave open places where you can put your fingers in. You cannot help it. You might with brick and mortar, but otherwise you could not exclude the mud and silt that comes in with the water, and the moment that gets in, your drain is done. With tiles, where the ends are fitted carefully together and the joints covered, you have something that will exclude the mud, and you can ordinarily keep the drains open ; and I should very strongly recommend to gentlemen to buy, as I and my neighbors are doing, tiles, even at a cost of twenty or twenty-two dollars a thousand for two-inch tiles, rather than undertake to use stone. There is a great deal of difficulty in working on that land with stone. In the first place, you have your stone to haul there. Well, four oxen, with a cart, can carry but a very small quantity of stone on an ordinary undrained meadow. It will take several cart-loads to make even one rod of stone drain in almost any meadow; whereas, with a wheelbarrow, you can carry tiles enough to lay six or seven rods. The tiles weigh about three pounds apiece, and one hundred of them will go a hundred feet. Ordinarily, you do not have stone on these meadows. You may have it in the neighborhood, as Mr. Flint says, but all land does not afford you stone on the surface.

A Member. How deep would you lay them?

Mr. French. I would lay them four feet deep, if I could get them in. That is one thing that it is almost impossible to make farmers believe, or practise; and for this reason, that they will try draining by laying their drains two feet deep, and they say they drain the land enough, for no man ever laid a drain through a piece of land that he did not see the benefit of it. If he does not go deeper than a foot and a half, he is amazed to see the improvement he has made; if two and a half, he thinks that is enough. That is one point that has been dwelt upon very much by English engineers, and there is but one opinion about it in England. I think the best drainage engineers all advise, as a general rule, the putting of tiles four feet deep, if you can get a fall that will carry the water away. The advantage is, not that you want to carry the water off four feet below the surface, because the crops would grow well enough if you kept it two feet below the surface, but this is the advantage: we have sometimes a rain-fall of three, four or five inches in twenty-four hours; it is not an uncommon thing to have two or three inches, and I think we have had, in one instance between five and six inches within twenty-four hours. In England, one inch is an extraordinary rain-fall. We have twice as much rain as they do. In the middle counties, they have twenty inches; we have forty and forty-two. Now, suppose you have a piece of land in which you have laid tiles four feet deep. In a dry time, all the water that will run off has settled down to that depth. After a long drought, there comes a rain-fall of three or four inches in twenty-four hours. You have four feet of dry soil. The rain goes all through that soil, and it will hold it, without leaving any on top. Now suppose your drain is just two feet deep; you get three or four inches of rain-fall; the water is within two feet of the bottom of your tiles, and when the rain begins, it fills you right up at once, and floods your potatoes or corn which you have just planted. It will stand two or three days, and your seed is all rotted; whereas, if you had gone two feet deeper, the soil would have been dry enough to have held all this rain-fall, and you would have saved your seed. In this regard, it is very important to get your drains deep. And then, they are out of the way of the subsoil plough, out of the way, substantially of the working of moles and mice, and out of the way of roots. And that is a point of very great importance. You will find practically (and there are some gentlemen here who know about it,) that drains are very often obstructed by roots; even tile drains, laid just as close as you can get them, and four feet deep. I have seen the roots of the trees in an apple orchard running to any extent inside a drain—little fibrous roots, that go like the air, anywhere. Even mangold wurzel roots have been known to go into tiles laid four feet deep. They get in through the cracks, and if you put your tiles in only two feet deep, you would be very likely to get your drain stopped up by roots.

Mr. Keyes. What is the lateral effect by increasing the depth of a drain?

Mr. French. It increases the effect laterally. Water always seeks the lowest point. Gravity carries it down. You dig a hole in the ground, and all the water in the neighborhood tends down to it. It goes to the lowest place. You dig a two-foot drain, and a four-foot drain beside it, and the water all goes into the four-foot drain. The four-foot drain runs the soonest, and the two-foot drain will carry no water unless the four-foot drain is full. The deeper a drain is, the further it will drain, because the slope is moderate throughout the bottom of it. Of course you may get a drain so deep that it will not drain the surface at all. I think the English authority is satisfactory upon the point that four-feet drains, even in that climate, where they have less rain than here, are attended with the best results; although I will state here—which I have had occasion to show by pretty careful mathematics elsewhere—that it costs twice as much to dig a drain of four feet as it does to dig one of three feet, for the reason that you have to open your ditch wider at the top, throw out more earth, lift it higher, and ordinarily it will be harder to move, and you work at a disadvantage. Still I have practised, as far as I have been able, putting my drains fully four feet deep; and I have, in my Exeter farm, found them wonderfully successful. Before I tried tiles, I tried all sorts of things. I tried bushes, and loose stones, and flat stones, and in all these ways I had good results temporarily. For a while they would drain sufficiently, but in a few years they would fail by getting filled up.

Mr. KEYES. A single question further. How near together should side drains be?

Mr. FRENCH. Of course I give nothing but an approximate answer to such a question. From sixteen to sixty feet would be given as the outside limits. In England, in clay lands—and that means clay in England; it does not mean what we call clay around here sometimes; it means blue clay, or brick clay—in such lands they sometimes put their drains as near together as sixteen feet. On ordinary loamy soil, or in peat swamps, I think you may put your drains from thirty to forty feet apart, and be pretty sure of good results if you get them four feet deep. I think that is ordinarily near enough. I have put drains in forty feet apart that have done excellently well. The deeper they are, within reasonable limits, the further apart they may be. In clay lands there is a singular effect produced by drainage, which I have witnessed myself, and writers on the subject speak of it. You may take clay land—brick clay—that will hold water, and put drains into it four feet deep, and in two years' time it will become full of cracks, so that the water will pass readily down through it; you will not find half an inch square that has not a crack in it; and this clay land becomes open, friable, so that its character is entirely changed.

The worst obstacle you will find will be from the drains filling with what writers call "silt," by which they mean a very fine sand—clay, so fine that it will pass almost anywhere where water will pass. I think people who have failed (and I don't think there are many,) in tile drainage, have failed by not being careful enough in securing the joints or in selecting the tiles.

They are generally a little crooked, and when put together will leave places that you can put your finger through. These places should not be left open. In clay soil or sandy soil a crack as large as a quarter of an inch should never be left. If you do leave such an opening you are very likely to have something work in that will obstruct your drain. But the obstruction of drains by filling depends very much upon the slope. It requires a great deal of care to lay a drain where there is but little fall. You may lay a drain well enough with five or six inches fall in a hundred feet, if you will lay your tiles with a continuous slope. If you have water running in your drain when you are laying the tiles you can lay by that. But, ordinarily, you should engineer more carefully than that. You should draw a chalk line above the drain and keep the slope by measuring downward from that. If you lay two or three by guess you will be surprised to see how much you get out of the way—frequently two or three inches, without perceiving it at all. If you rise but two inches, and sand enters, it will most likely fill up until the drain is completely stopped; whereas, if you have a continuous fall, ever so little, it will keep itself clear.

Where I could get spent tan from a tannery, I have generally found that as convenient as anything to cover the joints. Throw a shovelful upon the joint and let the men tread it down. If you cannot get that, get turf, and press it down and secure the joint in that way. The object is to secure it, in the first place. All the water that comes in is merely what soaks in at the bottom. If you can once get your drain fairly in and the earth packed down and settled, there is no difficulty afterwards about their filling. The great difficulty is, that you put the tiles in carelessly, and the first heavy rain that comes breaks in from the surface, and you meet with your misfortune generally very early in your experiment.

A Member. Would not sawdust answer as well as tan?

Mr. French. I should think it would. There is this advantage in using this kind of material, that if it gets into the drain, it will float out. It is very objectionable to pack in a parcel of loose stones about the tiles, because that merely keeps an opening above them, which is just what you do not want. There is one thing you may depend upon—you cannot keep the water out of tiles unless you cement them. You may put on anything, even puddled clay, and you cannot keep the water out, because that will soon crack and let the water through. The question every man asks about tile-drainage is, "How is the water going to get into the drain?" I can say, from my experience, as well as from reading, that if you can keep the earth and sand from getting in, the water will take care of itself.

The only form of tiles made here is the egg-shaped tile, flat on the bottom. No doubt the round tiles are better, for this reason—that you can turn them over and fit them better; but they are not made here. I have never seen any in New England. I have seen some in New York, where they are used in the Central Park.

A Member. Have you ever used cemented tiles?

Mr. French. I never have. I never have seen any used for draining land. I saw some in Hadley used for carrying water from one place to another, but not for the purpose of draining land.

A Member. Do you know whether they are manufactured at Northampton and Springfield? I have heard, lately, that there were some manufactured there.

Mr. French. I know nothing about that.

Mr. Manning. I recollect once building a stone drain in a piece of land where was, generally, only a foot and a half of mud, though in some places it was four feet deep. In digging down into that, it would cut off readily, but in some places it would cleave off and fall in. I put in a stone bottom and stone sides, and laid stone over it and covered it, about a foot and a half from the surface; but the sand kept constantly running down, and in a little while there was a place where it caved in at the side; and finally the stone washed away and it caved in.

Mr. French. As experience is always more satisfactory than theory, I will say that I had occasion to lay a drain through a piece of land that looked on the surface like dry land. I put in four inch tiles mainly, and there was a run of water that filled this drain full, and I had to put in plank to support the drains in order to get the tiles down. I laid this drain in 1852 or 1853, and the last time I was there, the whole thing was working just as well as it did originally. I should not expect that stone could ever be used, in a place like that, so as to exclude sand.

Mr. Brown. I should be glad of an opportunity to say a few words in relation to this subject, because it interests me greatly. The effects of drainage upon soils will be as surprising to persons who have not looked into the matter as any operation of the farm in which they have ever engaged, and, I am inclined to think, more so. It is one of those curious operations that sometimes work by contraries. In the first place, it makes cold land warmer; in the next place, it makes wet land dryer; in the third place, it makes dry land more wet; in the fourth place, it makes heavy land light; and, in the fifth place, it makes light land, in some cases, I believe, a little more compact. Now, if that is not working by contraries, apparently, I do not know what is.

In the first place, I say, it makes cold land warm. You will all ask me how. There is nothing that the roots of plants dislike so much, probably, as to stand over stagnant cold water, and if they can by any possible means run away from that cold water, they will do so. They will follow almost any course to escape going down into that cold water. Now, in the case of a drought, you will find that the plants on low, wet lands, fail the soonest; just where people who have not looked into the matter would suppose they would fail last. After there has been a drought of two or three weeks, if you look into what are called the low runs, you will find that the young maples and some other trees—the black alders, perhaps—are shedding their leaves. And why? Because the young maple grows on wet land, where the water is cold underneath, and stands within a few inches of the crown of the root; and it never throws a root downward to penetrate into that cold water. It will not go there. It skims along on the surface. You will find it only two or three inches below the surface; not much more than covered up. Consequently, when the drought comes, these roots, being right on the surface, feel its effects the soonest, and therefore, plants growing in lands that are ordinarily wet, are the very first plants to suffer. By taking that cold water away, you warm up the land. How do you do it? There are several ways, one of which is this. If the cold water is drawn off from below the surface, when the rain falls, it brings down with it a good deal of heat, and instead of running off in streams on the surface, it passes directly down, carrying the heat along with it.

As it passes down, the earth, being a great robber, robs the water of all the heat it contains, and keeps it to itself; so that if you should put a thermometer in where it falls, and find just where it stood, and then go to the outlet, forty or fifty rods distant, you would find it stands ten degrees colder than when it fell. That warms the land, and drainage enables this rain to penetrate the soil, and therefore it makes cold land warmer.

I said also that it makes wet land dry. You see that must take place by what has been said already. Water seeks the lowest level all the time, and when a drain is made two, three or four feet below the surface, there is a level which must be found, and the water percolates that ground until it finds that level, and consequently the land becomes dry.

I said, in contradistinction from that, that dry land is made wet. How is that done? When you have drained the water off, your land is dry, and in case of drought, if you make the surface fine, you make it dry; but if, by means of your machinery or your hoe, you keep the surface fine, you have it continually watered by the atmosphere. We could not live five minutes if the atmosphere was not moist, but it is full of moisture all the time. A great wet blanket, as it were, is imparting its moisture to that fine surface, which receives it into its many million mouths, and passes it along to other mouths; down it goes, down it goes, continually robbing the atmosphere of its moisture, until it gets down where the earth is a little cooler than the atmosphere, and then it condenses into water. Just exactly as water condenses on the outside of your pitcher on a hot day, when you go to the well and fill it with cold water, and set it on the table. In a few moments, the outside is covered with drops of water, and you say "it sweats." But there has not a particle of water passed through the pitcher. It is only the colder surface of the pitcher that condenses the vapor in the atmosphere into drops, and it trickles down the pitcher, and wets the table-cloth. I think it is just as clear as anything can be, that draining makes wet land dry, and dry land wet.

I believe you can cultivate a piece of land that is thoroughly drained—if it is anything like hard land—at about one-half the cost that you can wet, heavy land. The operations of tilling the soil are infinitely more easy than they would be if the land were compact, were hard.

Now, all lands, I think, have inherently, the power of self-recuperation. I do not believe there is a rod of land in this town that cannot be brought into fertility without adding one particle of manure. Heaven has been more favorable to us than to leave land in such a condition that it will always be barren ; it only requires a fair chance. If it is skimmed over with a crust, it may remain for a hundred years, and not become fertile ; but if you remove that crust, and get it into a fine tilled surface, it will improve from year to year, vegetation will spring up on it, and grow luxuriantly. Now, one of the effects of drainage is to give land a chance to do something for itself. That will help it much, without the aid of ploughing, manuring, or seeding, or anything of the kind. I could show you, within half a mile of where we stand, a meadow that was covered with hassocks from three to ten inches high—the whole meadow nearly covered with those hard, unsightly, inconvenient hassocks. A ditch was dug through the entire length of that meadow, and a stone drain built. It lasted about seven years, and it operated precisely as Judge French has said. A mole would work its way down or up into the drain, and then would come a heavy shower, and wash the fine mud down there, and one winter, after the drain had been laid seven years, I noticed a circle about six feet in diameter where the grass was just as green in January as it was in June. I went up to see what was the cause of it, and found a warm stream bubbling up and spreading all over this surface. The ditch had become filled up, and the water had broken through the ground, and was sufficiently warm to melt the snow and keep the grass green through one of the severest winters we have had for fifteen years. Then a tile drain was put down by the side of this stone drain, and there has been no trouble since. One side of this meadow was drained by lateral drains, and these were about twenty feet apart, and four feet under ground. You see how rapid the process must be, where you put drains down in that way. The consequence was, that in the course of two or three years, without carrying a plough upon the piece at all, or one particle of manure or seed, every hassock disappeared, the ground became smooth and beautiful, and timothy came up there four feet high, and some of the heads measured nine inches in length. That was the effect, I say, of draining the land. On the other side of the ditch, where no lateral drains were made, the hassocks remain to this day.

This is certainly one of the most interesting subjects relating to farming operations, and I think that our people ought to give it more attention. I feel obliged to the Board of Agriculture for introducing it here, and hope it will be fully discussed.

Mr. Ward. This is a subject on which I am entirely ignorant, and I would like to ask Mr. Brown if, in connecting his pipes, he makes them close, so that there shall no water work in in at the joints?

Mr. Brown. No, sir, you cannot get them so close together. As has already been said, they are a little crooked, because they are dried standing up edgewise. But if you should make the joints perfectly tight, the water would get through. Suppose you suspend a brick by a string and pour water upon it; in half an hour you will find the water upon the other side, because the brick is porous. The tile itself is porous, and the water would pass through, even if the joints were perfectly tight. But you cannot make the joint so tight as to prevent the water from getting in. When I lay my drains I pick up all the old pieces of tin and sheet-iron I can find—sheet-iron stoves and tin kitchens—and cut them up into strips, and when I have laid a couple of tiles, I put a strip of this tin or sheet-iron over the joint, of course covering carefully with straw, or brush, or anything I can get, before I throw the earth on; and never yet, though I have some drains that have been in ten or fifteen years, have I found a tile-drain filled up.

The Chairman. I will ask Mr. French if he has had any experience in the manufacture of these tiles?

Mr. French. The first tiles I used, in Exeter, N. H., I bought in Albany, paying $12 a thousand for them there, and transported them at an expense of $12 a thousand more. Not liking to buy them at that price, but finding, by that experiment, that tiles were what I wanted, I went to a potter in the town, and asked him if he would burn me some tiles. He said he would, and I sent and got a machine to mould them, and went into the manufacture myself. After a little while some of my neighbors—the man who owned the clay and somebody else

—said they would like to buy the machine and take the business out of my hands. That was all I wanted. They did so, and another person set up opposition, and erected a regular set of tile works, which are there now. That was perhaps fifteen years ago. I will tell you this, as the general conclusion to which I have come in regard to it, that you can make two-inch tiles, which are the best size for ordinary use—for large drains you will want a larger size, but nine-tenths will be of that size—at just about the same price as ordinary brick. That, of course, varies from four or five dollars a thousand to fifteen, with the different localities, but I think that is a fair estimate. They require less clay, being lighter than brick, but the manufacture is a little more expensive, because they are not so compact and not so easily handled. The transportation will be a little more, because they are more bulky. There is no sort of difficulty in making them. Anybody who knows anything about handling clay could take up the manufacture and go along with it. In England tiles are frequently put into a brick kiln and baked with brick. Any gentleman who is near brick works can help himself in that way, by getting a machine and getting the brickmakers to burn the tiles for him.

Adjourned, *sine die.*

ANNUAL MEETING IN BOSTON.

The Board met at the office of the Secretary, in Boston, on Thursday, the 30th of January, at 12 o'clock, M.

Present, Messrs. Baker, Billings, Birnie, Cleaveland, Clement, Cole, Davis, Durfee, Fearing, Hubbard, Hyde, Johnson, King, Knowlton, Loring, Moore, Porter, Saltonstall, Sanderson, Sewall, Slade, Smith, Thatcher, Thompson, Thomas W. Ward, H. S. Ward, Watkins and Wilder.

Colonel WILDER was requested to preside, and accordingly occupied the chair.

After the reading of the records, a committee was appointed to consider and report the order of business for the session, consisting of Messrs. Saltonstall, Davis, and Ward of Shrewsbury. This committee subsequently submitted the following:—

1st. Report of Examining Committee of the Agricultural College, and all other business coming before the Board as Overseers of said College.

2d. Reports of Delegates.
3d. Reports of Committees.
4th. Essays on Special Subjects.

This report was accepted, and Mr. Hyde, chairman of the examining committee of the Agricultural College, presented the following Report of the committee appointed to attend the examination of the

MASSACHUSETTS AGRICULTURAL COLLEGE.

The Committee appointed by the Massachusetts Board of Agriculture to attend the examination of the Agricultural College at Amherst, having attended to that duty, respectfully submit the following Report:—

The first session of the college commenced October 2, with a class of thirty students, and closed December 17, at which time the class had increased to forty-six. It was our pleasure to be present on the last day of the session and to hear the class review the studies to which they had given their attention during the term. The examination was conducted by Prof. Snell in geometry, by Prof. Goodell in physiology and gymnastics, by President Clark in chemical physics, and Prof. Stockbridge in practical agriculture; and in all these branches the students showed proficiency, especially considering that only one short session of eleven weeks had been devoted to study, and that many of the students labored under the disadvantage of commencing late in the term, and both professors and students had entered upon a new enterprise, in which were few precedents to furnish light for their guidance. The first glance at the class showed a company of bright, intelligent faces, such as would do honor to any literary institution in the land, and such as we might expect among the sons of the most enterprising yeomen of Massachusetts. Their age varied, we judged, from sixteen to twenty-five, and though this disparity might seem to be a hindrance to their pulling evenly together, still, during the exercises of the day, both physical and mental, we did not notice but that the younger kept up well with the older. A glance at the class also convinced us that order, the first law of schools, as well as of heaven, had been enforced upon the students, not by despotic power, but by the magic which a candid, calm, but firm and decided will of the superior always exerts upon the inferior. A more extended observation only served to strengthen our first impressions. There was a manifest sympathy between teachers and scholars, which led them to feel that they were a unit—partners in a grand enterprise—the success of which depended upon each man's doing his duty. This power of enlisting the sympathy and controlling the public opinion of a school is the great secret of success in its management. We had but to shake hands with President Clark to feel that he was enthusiastic, and all the manifestations of the examination proved that his enthusiasm had diffused itself among his associates and pupils.

The recitation in mathematics was good, considering the short time that had been devoted to this study, and also the fact that few of the students, probably, had been previously trained to habits of investigation in this exact science. Pure mathematics are dry fodder for most minds, even when well disciplined, but to take boys from a farm and put them to the study of geometry, is like taking cattle from foraging in a green pasture, and confining them to be fed on dry hay. The examination in chemistry showed that this science had been pursued with a better relish, and had been better digested. Probably many of the students, while pouring over the demonstrations of Euclid, had asked, "What is the use of this?" but while pursuing the less abstract science of chemistry, its practical bearings on their future business were so manifest, that they were encouraged in their course by seeing the goal so plainly in sight. Many older heads, on looking over the list of studies in the college, have asked us, "Why is the course of study so comprehensive, and the time for study extended to four years?" The impression on some minds seems to be that lads can go to an Agricultural College, and graduate, much as our clerks do from our commercial colleges, after taking twelve lessons in writing and six in book-keeping. We might put boys through our Agricultural College in the same style, giving them a few lectures on chemistry, and a lesson or two in digging potatoes, and they would graduate dunces, having acquired little knowledge, less mental discipline, but much conceit by their college course. But if we wish to elevate the business of farming, if our aim is to develop true manhood, and lay the foundation for intellectual strength in the students of the college, then we must have a comprehensive course of study, and ample time to pursue the allotted studies. Possibly the designated time of four years, may prove, on trial, to be too extended, but we are happy to learn that most, if not all who have entered the first term, have enlisted for the full course. It is well to have the standard high, and it will be an easy matter to reduce the time to three years, if on trial, it is found expedient. We were particularly gratified with the exercises in gymnastics, under the direction of Prof. Goodell. These exercises tend not only to develop muscle and promote health, but also induce a gentlemanly bearing and a graceful motion, qualities in which farmers are sometimes accused of being deficient. The elasticity, precision and grace of manner which are usually taught in our fashionable seminaries by an expensive course of dancing lessons, may as well be inculcated in a thorough gymnastic course. Dancing, indeed, is only one form of gymnastics, and if necessary, can be incorporated into the course; but so far as we could judge from the lithe and manly motions of the young men under Prof. Goodell's training, it will not be necessary to put them through the mazes of the polka and schottish. We hope to see the graduates of the Massachusetts Agricultural College as distinguished for their gentlemanly habits and polished manners, as are the graduates of West Point. Rusticity should not be derived from and associated with life on the farm. There is no reason why a farmer should not be a gentleman, in the highest sense of that word,—gentle, both in thought and manner; and one of the advantages which we hope will accrue to the farming interest from the establishment of the Agricultural College, will be an improvement of manner in our rural population, so that rustic shall no longer be synonymous with clownish, as Webster now has it.

The examination of the class by Prof. Stockbridge, upon his teachings of practical agriculture, both in the field and the recitation room, proved that the strong common sense and keen observation of the Professor, had made an impression upon his pupils. The class had labored under the disadvantage of having no text-book, adapted to their wants in this fundamental part of their education, a deficiency which we trust some of the learned professors of the college will remedy ere long.

Interspersed through the forementioned recitations, were exercises in composition and declamation. This department is also under the care of Prof. Goodell, and the pupils showed good training in the forum as well as in the gymnasium. The ability to communicate thought by written and vocal language, is one of the highest God has given us. The power which the orator has over his fellow-men, convincing their understandings, and swaying their feelings, is the highest which man possesses. We were glad to notice that this power is cultivated in our Agricultural College. Farmers as a class have not given that attention to rhetoric which its importance demands, and consequently have not exerted that influence to which they were otherwise entitled by their numbers, wealth and sound judgment.

The little leisure that was given us after the close of the examination, was spent in looking over the college buildings and grounds. We will not detain the Board with repetition of information on these points which can be better obtained from the report of the Board of Trustees. The farm is large and will require all the knowledge, ability and energy of Superintendent Stockbridge to bring it into a model condition. The buildings are good, so far as they go, but their capacity is exhausted by the present class, and a new dormitory and a larger boarding-house will be needed for the accommodation of the freshmen of next year. An appeal will probably be made by the Trustees to the legislature for aid in the erection of these buildings, and we trust will not be made in vain. The present dormitory only furnishes accommodation for forty-eight students, giving a sitting-room and two small bedrooms for each couple. We looked into some of these rooms, and found them comfortable and orderly.

Our attention was particularly called to a conservatory, built by the liberality of one of the members of our Board, and mostly filled by the liberality of two others. This conservatory is adapted both for the rearing and propagation of plants, and is built on the plan of two octagons, forty and sixty feet respectively in diameter, and connected by a glass house twenty-five feet in width. Grouped around these octagons are compartments for different kinds of plants requiring different amounts of light and heat. In the centre of one was being built a tank for the reception of the Victoria Regia, with different aquatic plants ranged around its sides. In the centre of another, a large variegated century plant, cultivated for thirty years by Dr. Hitchcock, was already thriving in its new home. In the centre of another a fine specimen of the banana was to be seen. We are not connoisseurs in these matters, but the arrangements of the building and the thrift of the plants were evidently a source of great delight to the eye of President Clark, and in his skill and taste we place implicit confidence.

In conclusion, we congratulate the Board and the State generally that Massachusetts has at length, after long throes and struggles, produced a live Agricultural College; and if "the child is the father of the man," the promise for the future is all we could desire. We know that other similar institutions in our country have generally proved failures, and that governors and other wise men still predict the failure of this experiment; but having been on the ground and seen the vigor with which this young institution comes into existence, we have high hopes that it will reach maturity and have a long and useful career. It may need careful nursing, but we have faith in its present guardians, and faith in the State by which it must be supported. Massachusetts has ever taken the lead in charitable and educational institutions, furnishing models for the other States, and we hope now to see a model Agricultural College. We have in comparison with many other portions of our country, a sterile soil and a rigorous climate; but if we cannot compete with some of our sister States in raising Shorthorns, we can raise what is infinitely preferable—we can raise men; and Amherst affords excellent facilities for their education.

ALEXANDER HYDE.
WM. BIRNIE.

This Report was adopted, when it was unanimously

Voted, That the Massachusetts Board of Agriculture, as Overseers of the Massachusetts Agricultural College, are desirous of uniting with the Trustees of the College, in petitioning the general court to make an appropriation for the erection of such additional buildings as are absolutely necessary for the uses and the prosperity of the college.

Voted, That the Secretary be instructed to communicate a copy of the above vote to the Trustees, to be communicated by them, if they see fit, to the legislature.

Voted, That the subject of the connection of the Board with the Agricultural College be referred to a committee of five, to be appointed by the Chair, to consider and report upon it to the Board.

Messrs. King, Saltonstall, Davis, Hyde, and T. W. Ward.

Messrs. Porter, Sanderson, Clement, Billings, Stockbridge and Durfee presented their reports as delegates respectively to the Worcester South-East, Hampshire, Hampden, Hampshire, Franklin and Hampden, Franklin, and the Martha's Vineyard Societies.

SECOND DAY.

The Board met according to adjournment, Colonel WILDER in the chair.

Reports of delegates were submitted as follows: By Dr. Loring upon the Middlesex South; Mr. H. S. Ward upon the Essex; Mr. Hyde upon the Worcester North; Mr. Johnson upon the Hampden East; Mr. Knowlton upon the Norfolk; Mr. Cole upon the Bristol; Mr. Watkins upon the Bristol Central; Mr. Hubbard upon the Plymouth; Mr. Thatcher upon the Barnstable; Mr. T. W. Ward upon the Nantucket.

Mr. Slade submitted the following Report on

HEDGES AND FARM FENCES.

The planting of hedges and the building and maintaining of farm fences is truly a very important item of farm husbandry. The amount annually expended for these purposes forms no small item in farm accounts.

As this class of improvements does not directly contribute to the yearly income of the farm, in many sections of the State they have been sadly neglected.

To see a farm neatly and handsomely fenced, while travelling in almost any direction, is an exception to the general rule; while a reeling rail fence or a dilapidated stone wall is a prominent feature in almost every landscape. Yet there is no investment which gives a more real or permanent value to the farm than that which is made for the purpose of neatly and substantially inclosing its fields.

A farm that is well fenced, though its soil be but moderately productive, is almost certain to attract the attention of a purchaser as well as traveller. Aside from this, such improvements greet and gladden the eye of the occupant from day to day, and afford him the agreeable satisfaction of feeling that his cultivated crops are secure against the ravages of his roving herds. Fences built of stone are undoubtedly the most durable, substantial and economical; and for this purpose nature appears to have furnished a large majority of the New England farmers with ample material for fencing their farms into fields of convenient size. When a stone wall is to be built, a trench should be dug below the frost line and wide enough to take the bottom of the wall. This should be filled with small stones, and the foundations of the wall laid near the surface. This not only secures the wall against the action of the frost, but at the same time accomplishes a certain amount of drainage, which of itself will fully compensate for the extra outlay and expense. If such a wall be not over four feet in height, and be built in a workmanlike manner, it will not be likely to need any repairs from the present generation, to say the least. We frequently err in building farm walls too high. High walls are much more expensive to build, more liable to fall after they are built, and by the roadside are in exceeding bad taste. To a certain extent they break off the view from the adjoining fields, giving to the highway a sort of dreary and monotonous aspect, at the same time making it a complete receptacle for all the snow which a driving storm can deposit between its walls.

Where, from a scarcity of stones, it is necessary to construct fences of wood, it becomes a matter of considerable importance as to how posts and stakes may be rendered most durable. A chestnut post six inches in diameter will not ordinarily last more than ten years in a dry soil, and if the soil be moderately wet it will decay and fall down in a much shorter time. White cedar will stand perhaps fifteen years. The red cedar, or juniper, and the locust are undoubtedly the best kinds of wood to resist the action of the weather, and therefore for fencing purposes are almost invaluable. The juniper is usually found on rocky hillsides and stony pastures, and therefore is seldom used for fencing purposes in the neighborhood where it grows.

The scarcity of the locust in this latitude, and the constantly increasing demand for building and other purposes, far exceeds the supply, and the consequent high price prevents its use to any great extent for common fence posts. Various expedients have been resorted to, to prevent the decay of wood, when exposed to the weather or buried in the ground. As yet, we believe, nothing has been discovered which renders it completely impervious to the action of the elements. The process of kyanizing is practised to a considerable extent for the preservation of railway sleepers, and we believe is found to well repay the expense. Experiments also prove that the ends of posts and stakes dipped in hot coal tar and then covered with coarse sand, are rendered quite indestructible for a long time. This very cheap and simple operation we have practically tested, with the very best results. And we would here state that a post or stake, inserted in the ground with the top or little end down, will last nearly twice as long as when the big or but end is put in the ground. Wood dipped in crude petroleum, or allowed to remain in it a few hours, is said to become exceedingly durable. Where there is a lack of fencing material, hedges may be planted, and, if properly cared for, can in a few years, be made to answer all the purposes of a fence. There are but a few shrubs, however, which are well calculated to make a close and impenetrable fence. For farm purposes, the Osage orange and the buckthorn are without doubt the best, although the former is not well adapted to the climate of New England. The buckthorn may be grown from the seed or plants, and with proper care, little or no difficulty will be found in making them live. A hedge, to be of practical use, must be thick at the bottom and therefore should be closely cut back, while young; and often pruned, in order to force out lateral shoots near the ground. When it has attained the desired shape and size, it will require an annual pruning, the best time for which is in July or August. When a hedge is grown for protection or for ornamental purposes, which is more frequently the case in New England, we prefer some of the evergreens, such as the American arba vitæ, Norway spruce, or hemlock. They are rapid growers, perfectly hardy, easily pruned, and form a delightful contrast with those deciduous shrubs or trees, which are robbed of their foliage seven months of the year.

The privet, though not an evergreen, makes a very beautiful hedge. It does not grow large, and if tastefully trimmed is truly ornamental. Its blossoms and its berries give it a charming appearance, and it holds its leaves till the near approach of winter.

AVERY P. SLADE.

The Essay led to some discussion, after which it was accepted.

THIRD DAY.

The Board met at 10 o'clock, Mr. KING, of Barnstable, in the chair.

Mr. Thompson presented a Report as delegate to the Middlesex Society.

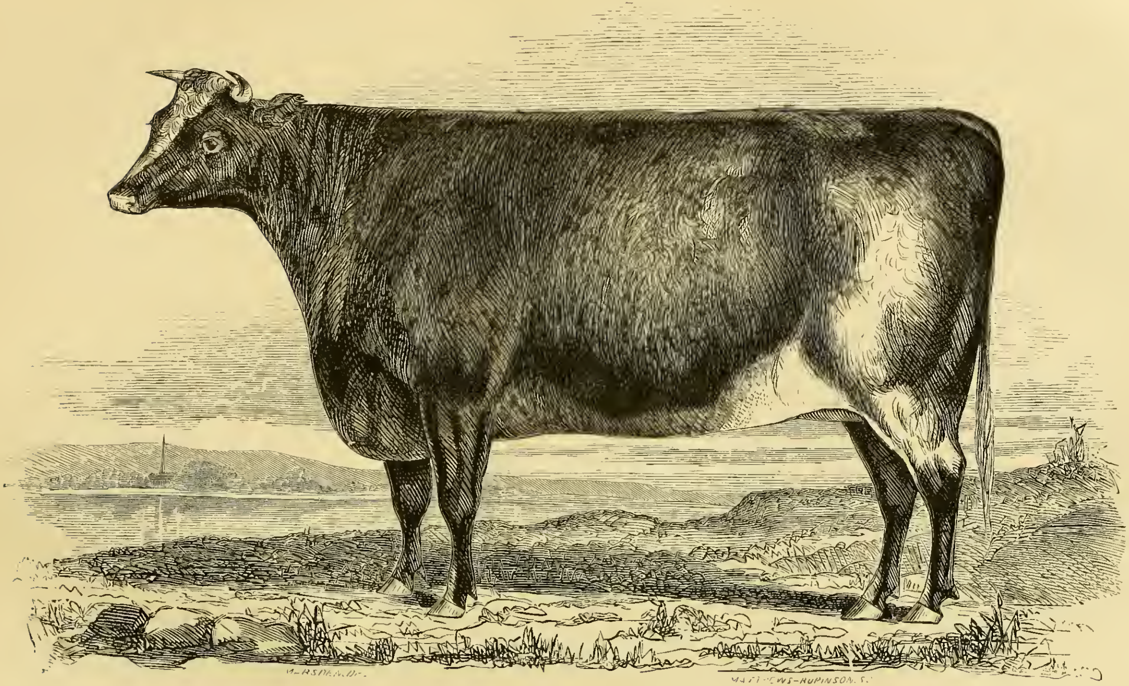
Mr. Smith presented the following Report, upon

MANURE AND ITS APPLICATION.

Manure, Webster says, "is anything which fertilizes land or furnishes food for plants." With this definition the subject under consideration takes a broad meaning, and may be applied not only to the productions of the barnyard, but to what are called special manures, (some of them,) and also to those materials, either vegetable or mineral, which are used either directly or indirectly for manurial purposes, such as muck, marl, clay, plaster of Paris or gypsum, salt, lime, gas lime, ashes, and vegetable matter in the form of green crops ploughed in. Thorough cultivation, drainage and irrigation will be allowed to be classed under this head also.

It will be a waste of words and of time at the present day to say one word in regard to the importance of making and saving manure. "Without good manure successful farming is impossible."

The farmers of New England do not build their barns over a stream of water, or practise moving their buildings to rid themselves of the manure accumulations. But there are practices in some (too many,) localities in which the loss is very great, if not as great, as in those above mentioned; one of which is that of driving the stock to the brook or spring to water, whereby the animals are exposed to the storms, and very much manure is lost.



"HOPE, 10TH"—Shorthorn —bred and owned by H. G. WHITE South Framingham. See Preface to Abstract of Returns.

This "waste of manures," of fertilizing matter, which if applied to the soil would make our impoverished farms as rich in production as a garden, is enormous. The amount of wheat-producing material which is yearly lost to agriculture and to the world, demands our attention, and the day is approaching when this waste upon our farms, and more especially in the cities, the waste of sewerage, shall be converted into fertilizing matter, to be used for agricultural purposes.

One writer upon this subject estimated "that every family of five persons annually created refuse matter sufficient to manure one acre of land; and that the fertilizing matter annually wasted in Boston was sufficient to restore 30,000 acres of poor land to fertility." It is estimated that the money value of this waste of fertilizing matter in the city of New York, exclusive of the products of the immense number of animals, amounts to $5,475,000 annually.

Experiments have been made to a small extent with the use of this sewage upon different plants with great success.

The question is frequently asked by the progressive agriculturist, "How can we make more manure?"

Those living near cities, or stables, resort to them for elements to supply to the soil that which their crops exhaust. Those living more in the interior, resort to muck beds, clay pits, scrapings from the roadsides, and to commercial fertilizers to help eke out their scanty supply.

In the tobacco growing regions, large quantities of hay, grain and oil cake are bought and fed to animals for the secondary purpose of obtaining the manure. And if it is true that the value of the manure does not depend upon the animal, but upon the food, then we are led to conclude that those who feed such quantities of fat-producing material as cotton-seed, rape and linseed cake, must have manure of great value. For according to Prof. Lawes, than whom there is no better authority, one ton of cotton-seed cake is worth $27.86, and one ton linseed cake $19.72, for manure.

Allowing these figures to be correct, and if these articles can be so fed that fair returns can be made in beef or mutton, we see the desirableness of depending more upon the manures of the farmyard, and less upon the worthless trash sold for fertilizers.

Of the importance and value of farmyard manure, Dr. Cameron, of the Dublin Chemical Society, says, "Farmyard manure is the best manure which can be applied alone, inasmuch as it contains all the elements required to nourish every kind of cultivated plant." But it is of little consequence what the value of the solid or liquid excrements are, unless they are husbanded. If manure heaps are exposed to the wash of rains, or if the drippings from the eaves to our buildings are allowed to run into the barnyard, until the yard is filled with water, and finally run off into the highway, or if no absorbents are used to save the liquids, but they are suffered to leach away, and so are lost. Bedding of some sort or other, whether it be of sawdust, sand, muck, or straw, when put under the stock, serves a twofold purpose, that of keeping the animals from filth, and to absorb the liquid manure. Too much cannot be said upon the importance of saving the urine of all our stock, for we are told by those who ought to know, that it is of equal value with the solids.

Those who have recently adopted barn cellars, or barnyards entirely covered, tell us that they can see a difference in the strength of the manure, which I account for by the fact that it is all saved, both liquid and solid; none is lost by the wash of rains.

MUCK.

Of the materials which are used as fertilizers, which are composed of vegetable matter, muck, or peat, may be considered as standing at the head, not only because of its value of itself, but because of its abundance.

Although muck may not be found on every farm, yet there are but few towns in which there are not large quantities. There is in the town in which is the residence of the writer, a number of muck swamps, some large and some small. One of these is situated some five hundred feet above the Connecticut River, and contains about twenty acres, and will probably average ten feet in depth, and consists wholly of vegetable matter, easily cut and free from stone or stumps. Now if it is true, as claimed by Prof. Dana, that two cords of muck, when mixed with one cord of stable dung, will make three cords, each of which will be of as great value for manurial purposes as the one cord of stable dung, then what a mine of wealth is contained in this one muck bed.

Muck may no doubt be applied improperly, and it must be better adapted to some soils than others. In order to be in good condition for use, it ought to have been dug a year, that it may be exposed to the frosts of winter and the heats of summer.

An individual of my acquaintance once carried from this swamp, before spoken of, to a field consisting of a soil quite light and sandy, a large quantity of raw muck at considerable cost, without producing very great results. Muck can be more advantageously used than to be used alone. When dry, its power of absorption is very great, and for this reason when used in the stables, or hog pen, or under the sink spout, or in the privy, large quantities of valuable manure can be made at a comparatively small cost.

It is especially adapted for use in composting with manure, and when mixed with ashes makes a compost coming nearer to stable dung than anything else we have. I witnessed last season an experiment with muck and ashes in the drill for English turnips. A large portion of the field was manured with a compost of barnyard manure. A small part of it had muck and ashes mixed, applied in the same manner as the manure ; four bushels of ashes were mixed with twenty-five of muck. The crop exceeded the other in luxuriousness and yield.

Too much can hardly be said of the importance of a free use of muck upon all soils which are sandy or gravelly, to be placed in the barnyards, and mixed with manure.

Farmers in some parts of the State have, during the past few years, expended large sums of money for what are called foreign manures—the phosphates, Peruvian guano, Mexican guano, African guano, sea-fowl guano, muriate of lime, flour of bone, ground bone, and a host of nostrums which have been conjured up to deceive the farming community and put money into the pockets of the vendor. If one-half of the money which had been expended for these articles which are sold for fertilizers had been laid out in draining or in better cultivation, or in labor in composting with muck, or in saving some of the "waste of manures," the farmers would to-day be better off. We do not utterly condemn the whole list of special manures, but we do say that animal or home made manures must be relied upon as the main stay of the farm. Others may be used as stimulants or helps. For instance, some plants which are slow to start, or feeble in their early life, may be benefited by a small dose of phosphate or guano ; or it may be seen, after the plant is up, that it is not coming forward fast enough to mature in our short season ; then an application of some quick-acting fertilizer may be used with profit, and the plant may have new vigor given it.

I have become satisfied that the most advantageous way of using special manures, unless it is in some particular cases, as previously stated, is in connection with barnyard manure.

If the object is to increase the value of your manure pile by the addition of some special manure, then thoroughly mix it with your barnyard manure, adding thereto some muck or loam, as the case may be.

An experiment came under my notice a short time since, which I will relate. A field consisting of ten acres was to be planted with corn. The autumn previous muck was carted on the field in several piles, at the rate of fifteen loads of thirty bushels each to the acre, and fish guano mixed with this muck at the rate of ten hundred pounds to the acre. The following spring barnyard manure at the rate of six loads to the acre was thoroughly composted with this muck and fish, it being worked over three different times. The land was ploughed, the compost spread, and worked in with the harrow. The result was seventy bushels of corn to the acre.

I have also known fish guano to be composted with barnyard manure of a dirty character, and spread on mowing fields in the autumn, to be followed with good results.

PLASTER OF PARIS A MANURE.

Plaster of Paris, or gypsum, when used on sandy loam, containing organic matter, generally gives satisfaction. It seems to be especially adapted to clover fields, applied to the clover and not to the soil, and also to be used on the manure pile and with manure. When, how and where to use these articles should be the constant study of the farmer.

I recollect hearing an observing man state at a meeting of a farmers' club, of his applying a small quantity of plaster of Paris to the hills of a piece of Indian corn, after the plants were up; but before he had finished, he was driven from the field by a shower of rain. After the shower he returned and finished the piece, but those rows which received the dressing before the shower were very much benefited by the application, while the others were not.

IS SALT MANURE?

If the testimony of distinguished agriculturists, both English and American, is of any weight, then common salt, used as a manure, is not sufficiently appreciated.

Sir. John Sinclair, whose practical knowledge and sound judgment are well known, wrote, at the commencement of the present century, as follows: "It is proved by a variety of experiments that sea salt, properly applied, acts as a manure." "It is particularly useful when mixed with a dung-hill or strewed over farmyard manures at the time when they are carried out into the field." It increases the crop of mangolds two or three tons per acre. Mr. John Johnston, the celebrated Scotch farmer of Western New York, says, in regard to an experiment with salt: "The line of demarcation between the salted and the unsalted portion is very distinct throughout the whole length of the field. It is some four or five days earlier."

Other instances might be given to prove the benefit of using salt, either on mowing or pasture lots; and it is the testimony of others that it is especially adapted to wheat crops, giving a brighter and stiffer straw and heavier grain. The quantity recommended to be used to the acre, both in England and this country, varies from three to twenty bushels.

GREEN CROPS PLOUGHED UNDER FOR MANURE.

This manner of increasing the fertility of the soil is not new. We read of its being practised by the ancient Romans and Grecians. It is practised now to a greater or less extent by almost every country.

John F. Wolfinger has written quite an elaborate report upon "Green Manuring and Manures," which was published by the Agricultural Department at Washington in 1864, in which the plants best adapted for the purpose are treated upon, and the testimony of distinguished gentlemen is given in favor of this mode of fertilization, as also some of the objections to green manuring are stated, such as the expense of seed for the growth, and the disadvantage arising from the acidity which green plants give to the land.

With this, as with everything else, circumstances must govern the practices we adopt. If lands be situated at a long distance from our barns, so as to make the expense of cartage to and from considerable, it may be well to adopt some plan of this kind; but with hay at from twenty to thirty dollars per ton, it seems to me that there would be more profit if the crop grown were clover, to make it into hay, feed it to stock, and apply the manure to the soil.

Clover is a valuable crop to raise for feed and manure. Prof. Lawes tells us that one ton is worth $9.64 for manure; but one of the greatest advantages in ploughing in a crop of clover, in my opinion, lies in the value of the roots of the plant.

IS LIME MANURE?

This question can be easily answered in the affirmative, if it can be proved that it tends to increase the fertility of the soil or furnish food for plants. There is a wide difference of opinion among farmers as to the benefits to be derived from the use of lime as a fertilizer. For while one man who makes an application of lime to his land finds his crop nearly doubled, another, with a similar application, finds the produce of his field not at all increased. Although a large number of instances might be cited where individuals had found an application of lime beneficial, I will mention only one, which is the one alluded to by Mr. Huntington, in his "Agricultural Survey" of Hampshire County, which may be found in Flint's Report of 1865–6, p. 301. The case is that of Mr. Green, of Hadley, who used lime with marked success, bringing his mowing fields from beds of moss to fertility, and to yielding good crops of hay.

Lime of itself will not give fertility to the soil, but acts as an indirect rather than as a direct nutrient matter to crops. Neither does it bring plant-food into the soil, but prepares that which is there for plant-food.

Lime has been condemned by many because of its having been put upon poor soils, so that it had nothing to operate upon. William Bacon says: "Lime is extremely valuable for lands which have acquired too much acidity." It is often used in composting with muck, and may tend to correct the acidity which is frequently found in that article. Lime should never be used with manure, unless the manure is immediately ploughed under.

IS GAS LIME MANURE?

The testimony of the members of this Board as given at the meeting at Concord, December, 1867, was in favor of the negative. But I am inclined to think that it may have been used improperly. From what I can learn from the statements of individuals, it should be used in small quantities. Mr. Whitman, of Little Falls, N. Y., in speaking of gas lime at a meeting of the farmers' club at that place, says: "Gas lime can be turned to good account if properly applied. We this year spread 1,000 bushels upon our meadows with good results, we think, paying largely in the increase of crop. At first we did not know how to apply it, and by putting it on too largely the plants were destroyed. Judgment is need in the application of all fertilizers, and especially with a material like gas lime."

Mr. Horace Russell, a farmer of North Hadley, has used gas lime quite extensively upon his mowing and grain fields, with satisfaction. He has stopped using it because of the expense of getting it, having to freight it some twenty miles by railroad, then carting it five miles in addition, to his home.

ASHES ARE MANURE.

They work admirably on some soils. It is a common remark in the Connecticut River Valley, that "a bushel of ashes will make a bushel of corn." A very good farmer of my acquaintance, who likes the idea of raising his corn cheaply, is accustomed to raise his corn on turf land, applying a few bushels of ashes in the hill, and succeeds in getting good crops of corn, which he follows the next year with tobacco, manuring bountifully, afterwards following with wheat, then with grass. Very good crops of corn are grown on turf land in a fair state of cultivation, with an application of ten or twelve bushels of ashes to the acre, in the hill. Ashes seem to be well adapted to mowing fields; the result of the application is to bring in clover. Onions are raised with success where ashes are applied together with manure. I would not be understood as recommending the mixture of ashes with manure in this case or any other, unless the mixture be immediately ploughed under; the result being similar to the mixture of lime and manure, it tends to dispel the ammonia in the manure.

Plaster of Paris when mixed with ashes and put in the hill for corn, produces excellent results.

Thorough cultivation and pulverization, are important methods of increasing fertility. Jethro Tull's theory was, that minute division, and pulverizing, without the application of manure, would maintain the fertility of the soil. And experiments have proved the value of pulverization. In ploughing, merely turning over the soil should not be the only aim, but to break it up and fine it. Continued stirring opens the earth to the influence of the sun and air, the earth is warmed, and chemical changes are produced, and each time the soil is stirred adds to its fertility.

But how can wet soils be pulverized? Ploughing tends rather to press together, and render them more compact, and less penetrable by air and water.

This leads us to ask the question,

IS DRAINAGE MANURE?

What are the effects of drainage? Thorough drainage deepens the soil. Of what use is it to plough deep and manure heavily, while the soil is full of water. The roots of plants will not go down into stagnant water. The elements of plant food, are not all on the surface, many of them have been washed down by the rains, some of them are found in the decomposing rocks themselves. Take away the water and the roots will find them.

Drainage lengthens the seasons. In our climate this is an important point to be gained. If by drainage, one or two weeks could be gained, it would be quite a relief in our backward springs, when there is so much to be done in a short space of time.

Drainage increases the effect of the application of manure, the soil being drier, is more easily worked fine ; the manure is also more evenly distributed. The water also passing through the soil, carries fertilizing matter down to the roots of plants. When there is stagnant water, manure must decompose slowly if at all ; but let the water pass off, the air is admitted, and decomposition takes place.

What observing man is there who does not know that his crops are improved in quality, by drainage ? Sweet English grass and clover take the place of sedge and rushes.

IS IRRIGATION MANURE ?

The author whom we have already quoted says, " Irrigation (in agriculture,) is the operation of causing water to flow over lands for nourishing plants." That pure water, when properly caused to flow over most of our soils in some seasons of the year, will cause a greater growth of vegetation, none will deny. But it has been clearly shown by some of our most distinguished agriculturists that the application of fertilizing matter in the form of liquid manure to the soil, was the best that could be used for the growth of plants. And there is no agricultural question more important than that of the improvement of the soil by irrigation, if by this means the rich organic and other matters which are now carried into the sea could be saved to agriculture.

The application of manure to the soil, so as to be of the most benefit to the crop and land, is a subject which circumstances have much to do with. Our soils, climate and seasons vary so much that no rule can be laid down which shall be applicable to all localities and crops. How much of the manure is lost by exposure to the elements, and how much by what is called leaching, are questions which are commanding the attention of practical and scientific men at the present time. And in what condition the manure shall be applied—whether in its fresh, green state, or when partially decomposed, after fermentation has taken place ? The proposition which was laid down by a former member of this Board, that " farmyard manure never possesses more of the elements of plant-food than in its original unfermented state," is no doubt true ; for whatever advantage fermented and rotted manure may have over unfermented, it is not claimed that by the process of fermentation it receives any addition, but that these are changes in the forms and combinations, that render the elements more available; fresh manure contains the elements of plant-food, but not the food itself.

S. W. Johnson, says that fresh manure is not a fertilizer, and cannot be appropriated to any extent. And Dr. Voelcker, shows that the amount of ready formed ammonia in fresh manure is very trifling, and that the proportion of soluble matters, both organic and mineral, is very small.

A writer in one of the late agricultural periodicals in speaking upon this very subject, says: "This accounts for the comparatively slow action of such manure," "and shows the need of such management as will best prepare the elements for the use of plants. This preparation is due chiefly to fermentation and decomposition."

Admitting it to be a fact that this fermentation must take place before manure becomes plant-food, and admitting it to be a fact that this fermentation will take place in the soil when applied in its green state, does it follow that the soil is the most suitable laboratory for its decomposition? Or, that when so applied the greatest benefit is derived therefrom? The slow and comparatively slight action of fresh barnyard manure in many cases, would seem to indicate that there was but little fermentation in the soil.

And may not this be one reason why we so often hear after a heavy coat of green manure has been ploughed in rather deep, that it produced little or no effect?

This is particularly the case in soils which are wet and cold. For it is admitted by all that manure in the soil can decompose only when the soil is favorable, neither too wet nor too dry. Now, if manure is buried too deeply in a cold soil, it must remain a long time inert, or, decomposition takes place so slowly that the succeeding crop receives no benefit from it, nor does it seem as if there was ever any perceptible advantage derived from the manure. I heard a gentleman of very much common sense, and candor, state not long since, that he ploughed in a heavy coat of manure ten inches deep, and that he believed that it was entirely lost to him. Now manure buried so deep as that, would not be very apt to lose its ammonia by evaporation, and as we do not believe in manures leaching, unless in very loose soils, the question will arise, what did become of it?

It may be said of dry soils, that the manure may be lost in a great measure, because of the lack of sufficient moisture to cause decomposition; in such cases the manure should be placed at such a depth as that it will decompose in season for the wants of the crop.

There is a fear in the minds of a good many farmers, that if the manure is spread on the surface, that there will be a great loss by evaporation. But it is the opinion of Dr. Voelcker "that the loss by evaporation of ammonia is very small when the manure is spread on the ground, the loss by evaporation of ammonia is when the manure is piled, and rapid fermentation is going on," and further he says, "that the great loss is by the washing of rains," and that the most advantageous way of applying manure would be on the surface, that it may be washed into the soil, by which means its distribution is more uniform than when ploughed in.

There have been some advocates of winter spreading manure. I was very much interested in reading a short piece written by the editor of the "Country Gentleman," published in that paper of the date of January 16, 1868, upon this very subject, a part of which I will quote:—

"We often hear the objection that manure will wash away and be lost. We have found this objection to be groundless, unless it is spread in the bottom of hollows, or swales, or in the channels of streams. As soon as the snow melts or the rain falls, there is always enough of unfrozen soil at the surface to absorb the dissolved manure. Even when placed on steep hill-sides we have never found the enriching effects of the manure to extend down the surface more than three feet on grass lands. Those familiar with the process of irrigation are aware that the large quantity of water used for this purpose has its fertilizing portions quickly abstracted from it by the grass among which it runs. After several years' trial, we have become satisfied that winter manuring is much better than applying just before the ploughing is done. At the same time that the injury to the soil in spring by drawing heavy loads upon it is avoided."

Although it seems to be the opinion of most sensible farmers at the present day, that surface application is the most beneficial, yet it appears to me that if long or coarse manure is to be used at all, it should be buried so deep that it may receive that chemical action which is constantly going on in the soil in order to reduce it to a condition that shall render it perfectly adapted to the nourishment of the growing crop.

Thus it seems we can make no rule for the application of manure, which shall hold good in all cases. The true way will be to follow the example of the painter, who "mixed brains with his paints;" we must mix brains with our manure.

JNO. M. SMITH.

This Essay was followed by a lengthy discussion, which continued till 1 o'clock, when it was laid on the table, and the Board adjourned.

FOURTH DAY.

The Board met at 11 o'clock, A. M., Mr. SEWALL, of Medfield, in the chair.

Mr. Hubbard submitted the following Report, upon

THE HAY CROP.

In calculating upon the agricultural interests of any section of country, one of the first things to be considered is, what crops are best suited to the soil, and at the same time what ones will bring the greatest returns for the amount of capital and labor expended.

On the fertile prairies of the West the farmer makes the wheat or corn crop a specialty, because he finds the soil better adapted to those than to any other crop he can cultivate. With the Massachusetts farmer, generally, it is far different. There are some sections, near our large cities, where the soil is easier of cultivation, where it can be highly manured, and where vegetables can be easily and with small expense put into the markets; there the cultivator of the soil will find gardening far more profitable than to give his attention to the raising of stock, or to the cultivation of those crops that are needful for their support. But with most farmers the grass crop is the important one, and the one to which he must devote a good share of attention if he would succeed in his business.

In considering this subject, there are three important things which should receive attention, viz.: the importance of the crop; how it can be improved; and the best mode of securing it.

Statistics show that the value of the hay crop in Massachusetts, in 1865, was $13,195,274, and the value of neat stock, horses, mules, asses and sheep, was $19,854,580; so that for every dollar's worth of stock there was less than sixty-seven cents worth of hay, which will at once be seen to be a small allowance when we consider that there is a large number of horses and many cows and oxen that are fed on hay and other articles of food almost and many of them the entire year. This deficiency must be made up from other articles of food, and to a great extent from corn and the smaller grains, some part of which are raised in our own State, at a much greater expense than the same value of hay. But large quantities are transported from the South, and much larger from the West.

Taking into account the number of animals in Massachusetts and their value, which are dependent to so great an extent on the hay crop for their support, I think no one will for a moment question its importance, or fail to exclaim that this truly is an important one, and should receive a greater share of attention from the Massachusetts farmer than heretofore, and that he will not only endeavor to increase the quantity, but also the quality, and at the same time its value.

Hay, for the support of stock, is what manure manufactured upon the farm is to the farm—the foundation of its productiveness. It is the chief food to be relied upon for the support of our animals while the earth is bound by the frosts of winter, or ceases to furnish herbage to be cropped by the animals themselves.

Statistics show that in 1865 there were in the State 682,284 acres of grass land mown, and that the product was 622,671 tons; or about 1,825 pounds per acre, if we take the entire crop of the year. This shows a small yield, and far less than it might be. It was stated by a member of this Board, that a man owning four acres of grass land cut from it last year twenty-eight tons of well cured hay. This may seem a large statement, but it was further stated that he kept fifteen horses, and put all the manure made from them upon this piece of land. The crop was taken off three times during the season, which shows what can be done under a high state of cultivation.

All our grass land cannot be thus highly manured or be made to produce in such large quantities. But with proper attention, and improving all the resources of the farm for making and saving manures, no one will for a moment doubt the quantity can be greatly increased, and at the same time the quality greatly improved. One great difficulty arises, and that is from neglect. There is a continual cropping, and nothing returned to supply the waste.

The great law of compensation requires that where there is a continual taking from, there should be something added, to supply the deficiency. Everything about the farm for manufacturing and composting manure, should be carefully attended to, and the application be made to the grass lands, not however to rob the other crops, but to give this that share of attention which its importance demands. It is a common practice with many, to get what they can from year to year from their grass land, without doing anything to increase its productiveness, or to restore its constant exhaustion. If nothing else can be done, and the soil is suitable for it, let there be applied yearly, or once in two or three years, a small quantity of plaster, which will richly repay for the expenditure. Wood ashes, lime, or some other fertilizer may be applied with beneficial results; not, however, to lose sight of the manure to be made upon the farm.

Wet meadow lands are greatly improved by drainage, and the application of sand, or a sandy loam, with a further top-dressing of manure; and at the same time a sprinkling of grass seed. In this way the quantity, and at the same time the quality are greatly improved. I have known land that did not produce enough to pay the expense of cutting the grass, that by drainage, and the application of sand, was brought under the plough, and made to be exceedingly productive; and some that was drained and top-dressed simply, that produced two bountiful crops a year, and also of an excellent quality. Let farmers who have such lands consider this subject, and apply to practice what their own good judgment dictates.

When the grass crop is grown, this question arises, What is the best time for cutting, and the best mode of securing the crop? Steamed hay is said to be more valuable for animals. Now there is no doubt but what the nearer the hay is to the grass, the more nutritious and valuable for food. It is a common remark, that rowen is the most valuable hay for milch cows; and why? Because it is cut when tender, and possesses more of the nutritious qualities. This seems to be conclusive evidence that the first crop (and on most of the grass land the only one cut with the scythe, or machine,) should not be allowed to stand too long, until it becomes tough, and woody, and looses a great share of its nutritive qualities. It is a commonly received opinion, and probably a correct one, that the best time to cut grass is when it is in blossom.

It is evident that all cannot be cut at the most suitable time, so that it becomes the farmer to consider whether the loss by standing too long, will not be greater than by cutting too early.

I am decidedly of the opinion, that many farmers suffer greatly by letting grass stand too long, until it becomes tough and wiry, and loses most of its nutritive qualities. Economy demands that the work of haying should be commenced in season; that a suitable amount of help be procured, and the work pushed forward with energy. With the mowing machine, tedder and horse-rake, the work is carried on with greater ease and rapidity, securing the hay in many instances in much better condition. The hay should be dry enough to keep, but overdrying proves injurious, by lessening the nutritive qualities, and rendering it stiff and wiry.

Great care and the exercise of judgment need to be brought into requisition in order to secure the crop in the best condition. This cannot always be done on account of the unfavorable condition of the weather, but it should claim our special attention. I have not spoken of the different varieties of grass, or the time and mode of seeding, as these will vary in different localities. But if I have said anything to call attention more particularly to this branch of farming, or to quicken the energies of any so that they may cause their lands to produce two blades of grass where but one grew before, I shall be satisfied, and feel that I have contributed my mite to improve the agricultural interests of Massachusetts.

Newton S. Hubbard.

After some discussion, the Essay was laid over for its second reading under the rule.

Mr. Moore then submitted the following Report, upon

SPECIALTIES IN FARMING.

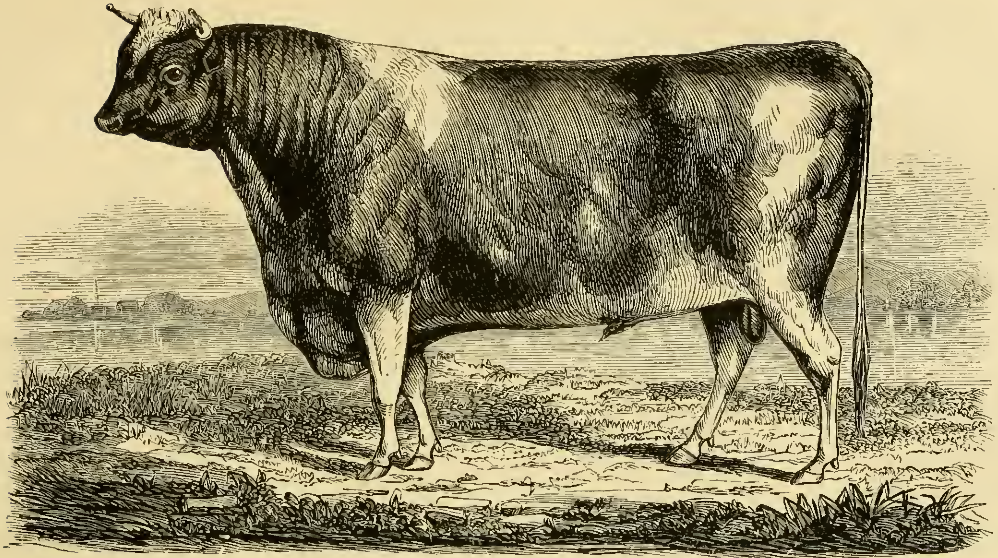
The Committee upon the above subject submit the following remarks upon it:—

In considering the best methods of farming, the cost of production, the economy with which a crop can be grown without too great exhaustion of the soil must be taken into account, for herein partly consists good and economical farming.

Now it is well understood, and does not require an argument even to convince the public, that it costs more in proportion to produce one bushel of wheat, corn or other grains, or one bushel of any of the varieties of vegetables, or one box or barrel of any of the fruits, than it does one thousand or more; and there is also nearly the same labor in cleaning and finishing up after a small quantity as there would be from a large one. If this proposition is true, and there is no doubt of it in the minds of your Committee, it would follow as a certainty that it would be better to produce a smaller number but larger quantities of one or more special crops, for by that means the cost would be less, and leave a larger margin for profit to the grower. To use the words of one of the ablest sons of Massachusetts, "success is a duty." Now, to be successful, it will, we think, be necessary to direct the attention to a less number of the various branches of this, the oldest and most extensive business in the world.

Can you expect any person, even of great ability, to succeed and attain that proficiency in all the different branches of farming that he otherwise would if his attention was directed to a few special crops?

Suppose a person undertakes to breed sheep, cattle, horses and swine, any of which, to be successful in producing the finest animals, requires a long experience, a partial knowledge of anatomy, or conformation of the animals, so that he may be able to select proper animals for breeders, and a knowledge of feeding in all its details, to be able to rear the progeny to greatest perfection; to have a dairy for supplying the market with milk, or for the production of butter or cheese, which would require a different method of feeding to produce those articles most



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"ABRAHAM." — No. 1 Jersey Herd Book. See Preface to Abstract of Returns.

economically; to grow all the varieties of grain, potatoes and other roots, which would require a knowledge of the special wants of each of those crops, including soils, manures, varieties and cultivation; to cultivate the various sorts of fruits, the production of which in perfection requires that a man be something of a horticulturist; and to attempt market gardening, which is really a full trade in itself.

Now to be able to do all the foregoing to perfection would require more energy and brains than falls to the lot of any man; and we should at once decide that no one could do all that we have mentioned, and do them well, or could attain to that degree of perfection which should be our constant aim.

In the mechanic arts it was found necessary, a long time ago, for the purpose of becoming skilful, to divide the subject into many trades. And successful manufacturers have found it advantageous to subdivide still more, as by that means their workmen can attain a greater proficiency in their business, and do it better and more economically. This the chairman of your committee found well illustrated in a recent visit to an extensive machine shop, where, in the making of a simple cotton spindle, one man forges, another fits, and still another grinds it, so that each spindle goes through at least three hands before it is set up in the spinning frame.

Now we claim that the business of farming is at least as extensive, varied, and requires as much skill for success as the mechanic arts. In the latter it has been found necessary to so divide the business that a man may become master of one branch. Should we not follow their example, and devote our time and attention to fewer branches of our business, and thereby master some particular branches and make them a specialty?

As another illustration, we will take the cabinet-maker, who undertakes to make a chest or bureau; he measures and cuts his lumber, planes and fits the pieces, puts them together and completes his work. This is a certain amount of skill applied to the raw material, and will produce a certain result, according to the skill applied; there is no element to step between and prevent it.

But how is it with the farmer? Can he measure the amount of rain he desires for his crops and have it from the clouds and no more, control the degrees of heat and cold, the quantity of sunshine, wind, and the length of the season to mature his crops? Certainly he cannot. He can only bring into use his long experience and observation. He does some brain work, and the result is, if he has made a specialty of some crops, and has studied their habits and particular wants, has indeed mastered his subject with those particular crops, he will succeed: but if he undertakes to dabble in every branch of farming, he will not be likely to attain any great skill in producing any particular crop.

How is it in the professions? Does any one succeed and become eminent until he has devoted almost his entire energies to his particular business? Certainly not. Such application is required to make Choates, Jacksons and Beechers, who, if they had undertaken all of the professions, very likely would not have attained much eminence in either.

Husbandry, like mechanic arts, means many trades combined under one name, too many for any one man to perfectly master; therefore, let him give his attention to some few branches as a specialty.

When we desire information about any particular crop, to whom do we go to get it? Why, certainly to the man who has studied its habits and wants, and made it a specialty. Who succeeds the best with any particular crop? Is it not the man who raises it largely, and gives his attention to it, who knows its habits, and how to grow it?

We are aware that it has been popular to advocate mixed farming, or in other words to raise a little of everything, which oftentimes in its results, means not much of anything. We are satisfied that it would be better to raise a smaller number of crops, and those in larger quantities. We find in all farming there must be some leading articles to sell, for money must be had to pay for labor, groceries and other articles, and that can be got more readily where some crop is grown largely for that purpose. And therefore we have come to the conclusion that the quicker our farmers devote their attention to a few leading articles, studying their habits and wants thoroughly, and making them a specialty, the better and more successful will they be individually as farmers.

JOHN B. MOORE.
AVERY P. SLADE.
CHAS. C. SEWALL.

The Report was laid over, under the rule.

Mr. King, from the committee on the connection of the Board with the Agricultural College, submitted the following:

Whereas, The Massachusetts Board of Agriculture desires by all means in its power, to secure to the people such an agricultural education as will enable them to develop the agricultural resources of the Commonwealth, and as it desires especially to promote the welfare of the Agricultural College, and insure its success; therefore,

Resolved, That Charles L. Flint, the Secretary of this Board, be authorized to deliver a course of lectures at the Agricultural College, or to discharge such duties connected with the instruction of the students at that institution as the trustees may assign to him: *provided*, that such services do not conflict with his duties as Secretary aforesaid.

Resolved, That it would be conducive to the interests of the Agricultural College, and add to the efficiency of this Board, to hold one meeting annually during the summer, at the college.

Resolved, That such portions of the library at the Secretary's office, as may be useful to the students and are not required in Boston by the Secretary for his own use, be transferred to the Agricultural College, and that Marshall P. Wilder, Charles L. Flint and Levi Stockbridge, be a committee to determine what portion of the library shall be removed.

The Secretary is instructed to certify a copy of the Resolves to the trustees of the Agricultural College.

This Report was unanimously adopted.

Mr. Hyde, of Lee, then submitted the following Report, upon

APPLE CULTURE.

Fruit is so comprehensive a term, and an essay on fruit must either be so general in its statements or so lengthy in its details, that the Committee to whom this subject was intrusted for investigation have ventured to confine their attention to that representative fruit, the apple. By this neglect of the other fruits we intend no disparagement to them. We love a buttery pear and a fragrant peach, and the plum and cherry and the smaller fruits are always welcome at our table, and we regret that our time will not allow us to pay our respects to them all; but for the present we must confine our attention to the king of the fruits, the apple. As bread is the standard among articles of diet, so the apple is the standard among fruits. Other fruits are good in their season, but their season is comparatively short. The apple lasts through the year, the Roxbury Russet often lingering with us till the early harvest puts on the yellow tinge of maturity. True, for the past four years the apple crop in New England has partly failed; but this failure is the consequence of causes which are temporary, and we doubt not that the promise that "seed-time and harvest shall continue to the end of the world," is as applicable to fruits as to grains. Without stopping to discuss the causes of failure, we may say, in passing, that the preponderance of testimony of the keenest observers favors the belief that the severe droughts of 1864–5–6 so robbed the apple-tree of its juices that it failed to perfect the fruit; and so much was the constitutional vigor of the trees affected by these successive dry seasons, that the wet summer of 1867 found them too feeble to bring forth much fruit, or even to blossom freely, though the health of the trees improved greatly under its moist skies. We make no pretensions to the ken of prophets, but we confidently expect another year will witness a bountiful crop of apples. The loss to the orchardist during these barren years has, however, not been so great as might be supposed. With apples at five and six dollars per barrel, and cider at eight and ten dollars, the producer has little cause for complaint, though he harvests only half a crop. The little, knotty, refuse apples commanded a higher price for the manufacture of cider the past autumn than was paid for good dessert fruit in the years of plenty.

OLD ORCHARDS..

The first point to which we wish to call attention is the renovation of the old orchards, planted by our fathers, some thirty, some sixty and some an hundred years since. Such orchards may be seen all through New England, with ugly, dead branches projecting out here and there, with trunks moss-bound and often rotten at the core, apparently cumberers of the ground, and certainly a deformity to the landscape. The question is, Shall we dig about and dung them or cut them down? This question does not admit an answer of universal application. Though we cannot put an old head on young shoulders, we may put a new head on an old apple-tree; but whether it will pay or not depends upon the quality of the apples, the condition of the trees and their former culture. If the orchard is one of grafted fruit, that has been well cared for and still shows manifest signs of decadence, it may as well be consigned to the woodhouse. There is no doubt but that grafted fruit, in elaborating its large size and delicate flavor, makes large drafts both on the tree and soil, and therefore sooner exhausts the energies of both. Like the roué whose vital powers have been exhausted by a life of wanton pleasure, when once the constitution gives way, no medicine can restore it. The native trees, on the other hand, not having been thus exhausted, have, even in their dilapidated condition, a reserve of constitutional force, and may be rejuvenated, by pruning, grafting and tillage, so as to pay well for the expense. A new top can as easily be put on an apple-tree as a new covering on an old umbrella. We have only to cut away the old, decaying branches and let some of the most vigorous suckers take their place. These suckers furnish just the right stocks for grafting, care being always taken to leave sufficient branches to furnish breathing apparatus for the tree. At the same time the old branches are lopped off, the trunk should be thoroughly scraped with a hoe, the suckers around the roots removed, and the whole tree washed with strong soapsuds. We have found soft soap as acceptable to trees as to men. We have sometimes used the pure article, and have never known any damage arise from its use on the trunks of old trees; but our more common practice has been to dilute the soap with half water. The effect of soapsuds on a tree is much the same as on a dirty urchin's face. As the unkempt and unwashed boy is hardly recognized after a thorough scouring, so the washed tree puts on an entirely different look. The bark becomes smooth and glossy, and is no longer the home of insects which formerly preyed upon the juices of the tree, but performs its designated office of aiding the leaves in their inspirations and expirations. The bark has much the same relation to the tree that the skin has to the animal. As we do not expect an animal to thrive, the pores of whose skin are stopped by dirt, scabs and vermin, neither must we expect a vigorous tree when the bark is scaly and full of cocoons and insects. If the soap is applied so freely as to run down among the roots, it will not be lost. It is one of the best stimulants that can be given to these roots, and acts on them as beneficially as the wine recommended to Timothy "for his often infirmities." We have sometimes seen whitewashing recommended for apple-trees, but we should as soon think of whitewashing a man. Lime may destroy some insects, but it stops the pores of the bark and deranges its respiratory functions, and must induce disease. We have found the latter part of May or the first of June the most propitious season for applying the soap, as at this time the bark lice are just being hatched out and are destroyed most effectually. The beetle, also, which lays the eggs for that terrible pest of the apple-tree, the borer, is at this season prowling about seeking where he may puncture a nest for his ovum, and turns up his nose in disgust at the villanous smell of soft soap. If by chance the eggs are already deposited when the soap is applied, their vitality is destroyed. We have never been troubled with the bark louse nor with the borer when we have thoroughly soaked our trees, and at the proper time. If the bark lice are not totally destroyed by the washing in May, a second crop is hatched out the latter part of July, and another washing at this time may be necessary.

Some recommend ploughing an old orchard as a sovereign remedy for the disease of its old age, and we grant that the first year after an orchard is ploughed, it generally bears well, but it is like the flickering of a lamp just before it is extinguished. Our observation has been that the ploughing of an old orchard does not give it permanent vigor. The severe root-pruning to which it is subjected by the action of the plough, induces the formation of fruit-buds, and a large crop of fruit follows for one and possibly for two years, but the trees mutilated in their roots, are soon exhausted by over-production, and speedily decay. The plough is a rude instrument for root-pruning. As Ik Marvel says, "It makes butcher work where nice surgery is demanded." The suggestion of Holy Writ, to dig about and dung the trees, is far preferable. This "nice surgery" is more expensive, but whatever is worth doing is worth doing well.

Some form of manure is absolutely essential for rejuvenating an old orchard. A tree cannot, like an animal, rove around in search of food. It does indeed send out innumerable little rootlets, and they are most diligent foragers, but their range is limited, and foraging for fifty or a hundred years in the same locality finally becomes poor picking, unless the soil is often replenished with the food which the tree may need. In a state of nature this supply of food is furnished in a good measure from the tree itself, in the decaying leaves and fruit; but if we carry this fruit to the cellar and carefully clear the ground of the leaves, it is robbery, unless we return some equivalent in the shape of compost. What this compost should be must be determined in part by the nature of the soil. An universal panacea has not yet been discovered, either in medicine or agriculture, but we are inclined to the belief that wood ashes contain most of the ingredients which apple-trees require. Certain it is, that a compost made of one part ashes and three parts muck, has answered a good purpose in our own orchard. Some soils might require an addition of more lime than is found in wood ashes, and in such case if the refuse plastering from old houses can be added to the compost heap it will prove a benefit as well as an addition. Many of our old orchards are doubtless past recovery. Neglect and old age have so reduced their vigor, that no medicine will avail for their restoration. Good nursing will, however, do more for these old settlers than we are wont to suppose. We know of an old orchard in one of our mountain towns, how old we cannot say, but it looked old to our youthful eyes some forty years ago, that for the past twenty-five years has been made to produce very fair crops of good fruit. The original trees were chance seedlings, planted by one of the good clergymen of the olden time, probably with a view of furnishing a little cider for himself and guests, for not one tree in twenty furnished any fruit fit for dessert. When this orchard came into the possession of the late Lieut. Gov. Hull, he dug around the trees, dumped a load of chip manure around each tree, gave them a liberal sprinkling of leached ashes, pruned and grafted, planted potatoes around each tree in a circle of some twelve feet in diameter, so as to insure a stirring of the soil, and some return for his labor, and the result was not only a large yield of potatoes, but the rejuvenation of the trees, and for a series of years some of the finest fruit that had ever been raised in the town. But we cannot depend upon our old orchards forever. This would be as unwise as depending upon our Shaker brethren "to multiply and replenish and fill the earth." There is a limit to the producing energy of trees, however well cared for, and we must resort to planting

YOUNG ORCHARDS.

Where shall we plant them is the first question. We answer briefly, in a good soil and a sheltered situation. The apple is hardy, has a wonderful power of adapting itself to any soil and situation, is never "staky," but puts forth its best energies wherever planted. We have admired sometimes seeing the seedling apple-trees struggling for existence among the rocks, or by the side of the road, browsed upon by the straying cattle, but never saying "die." It is a mistake, however, to suppose that the apple has no choice of location. There is a congenial home for the apple as well as for man. Whatever soil will produce a good crop of corn, will also produce a good crop of apples; but as the roots of trees penetrate much more deeply than those of corn, it will generally be found expedient to underdrain most of our sites for the orchard, certainly if the subsoil is of a cold, clayey nature. We were so unfortunate, some twenty years since, as to have a railroad laid out through a young orchard, just coming into bearing condition. The soil was of a gravelly nature, and on removing the trees and especially on removing the soil for the use of the road, we were surprised to see the depth to which the roots ran. They were luxuriating at the depth of six and eight feet. In a clay soil they might not have penetrated so deeply, but they should certainly have the liberty of wandering whither they please. We have read of a Pennsylvania farmer placing a flat stone under his apple-trees, in order to keep the roots near the rich surface soil, but this is not in accordance with "the freedom of the will," and we doubt not, when the roots reached the extremity of the stone, they turned downward in search of moisture and nourishment. Certainly here in New England we have little occasion for planting stones when we plant our apple-trees, but have need rather to remove every obstruction to the free wandering of the roots. There is very little of our New England soil that will not be benefited by a liberal application of manure, before an orchard is planted upon it. Some of our western fruit-growers complain that their soil is so rich naturally, that their trees luxuriate in a growth of wood and foliage to the exclusion of fruit; but we hear of no such complaint at the East. The site for an orchard should be deeply ploughed either with a Michigan or subsoil plough, and the manure thoroughly incorporated with the soil before the trees are planted. No subsequent culture will atone for the want of this previous preparation. The balance of testimony is in favor of keeping the orchard under the plough for a few years, either letting it lie fallow or raising root crops, but no grain. This has been our practice generally, but we have tried keeping one orchard in grass, digging around the trees occasionally with a spade, and top-dressing the grass annually, and the experiment has succeeded beyond our expectation. The trees may not grow so rapidly nor come into bearing so early as where the land is ploughed, but the trees are very healthy and have produced as generously as other orchards, though we have not failed of cutting two crops of grass annually from the same land. When so much is taken from the soil, generous returns must be made. If we cannot get something for nothing, we certainly ought not to expect two somethings for a cipher.

TRANSPLANTING.

How we shall plant our trees, is well answered by that poet of nature, Bryant:—

> "Come, let us plant the apple-tree.
> Cleave the tough greensward with the spade;
> Wide let its hollow bed be made;
> There gently lay the roots, and there
> Sift the dark mould with kindly care,
> And press it o'er them tenderly,
> As round the sleeping infant's feet
> We softly fold the cradle sheet:
> So plant we the apple-tree."

Transplanting is trying to the constitution of trees, however carefully "we sift the dark mould;" but in the rough manner it is usually performed, the trees have much occasion to say, "spare us from our friends." Our radical reformers do not uproot society more cruelly than some rude hands transplant trees. They seem to forget that a tree is a thing of life, that the rootlets are tender as "infants' feet," and that every mutilation of the trunk is as bad for the tree as phlebotomy ever was for man. The secret of transplanting is to handle the young trees as carefully as we do sleeping infants, and they (the trees,) can be put from one bed into another without knowing it. Their new bed should be made wide and deep, and if the slats are made of old ribs and other bones, all the better. Over these bones the soft mould should be sprinkled, and if the roots are carefully laid upon this and well tucked up with surface soil, our word for it, the trees will grow like willows of the brook.

VARIETIES.

Of the thousands of varieties of apple-trees in the catalogues of our nurserymen, which shall we select for a New England orchard? The answer to this question must vary somewhat with circumstances. The theory generally has been that winter fruit paid much better than summer; but if a sufficient market is near by, our experience is in favor of cultivating a due proportion of summer apples; and whether near to or remote from a market, enough Early Harvests, Red Astrachans and Early Sweet Boughs should be raised for family use. In the bilious dog-days of July and August, nothing is more grateful to the stomach than the acid of the apple. It is cheaper than pills and powders, and (begging pardon of the doctors on the Board,) far more effectual. A quarter of a century since some city cousins were making us a summer visit, and very naturally wanted some apples, and we scoured the home orchard and neighboring orchards in vain for some palatable fruit, and we resolved that another decade should not find us in this destitute condition. It was a mistake of our fathers that apples in the summer were unhealthy. On the contrary, ripe, juicy fruit is never more healthful than in the warm season; and that nature craves it is manifest from the multitudes of lawless boys and, we are sorry to say, men, that are so eager to club the trees as soon as the fruit, by its tinge of red or gold, shows signs of maturity. The market demand for fruit at this season has also greatly increased, so that we are inclined to think a good sprinkling of early apples in the orchard will be found profitable.

For autumn use, the Early Strawberry, Golden Sweet, Gravenstein, Fall Pearmain, Porter, Fameuse and Fall Pippen we have found to thrive well, and are essential in every well-appointed orchard. To the above named dessert fruits we wish to add the Drap d'Or, as a cooking apple of the most hardy and productive kind. During these late years of barrenness the Drap d'Or has never failed to yield bountifully, and the Dutch Mignonne has been like unto it. The trees of both these sorts seem to possess a constitutional vigor that enables them to bear fruit even in unpropitious seasons.

The name of good winter apples is legion, for they are many. We put the Rhode Island Greening first, as the tree is vigorous, produces an abundant crop annually, and not biennially, as does the Baldwin, and the fruit, both for the dessert and cooking, if not first-rate, falls but little short of it. The Spitzenberg has a far higher flavor, and for cooking is No. 1, but is too hard and indigestible for a dessert fruit, and the tree has not so vigorous a constitution as to warrant planting it in large quantity. The Hubbardston Nonsuch is excellent, but we are not ready to yield it the title of Nonsuch if that title means none so good. The Yellow Belle Flower is also excellent, if planted in a sandy soil. The Northern Spy is a great accession to our winter fruits, as it is a crisp, well-flavored fruit, good in January, is a late keeper, and the tree seems hardy; but with us the fruit has not been uniform, some specimens being large and fair and others small. The King of Tompkins County also promises well, but we have not tried sufficiently to pronounce with confidence upon its character. "Confidence is a plant of slow growth" among apples as well as among men. We are aware that we have left out the Roxbury Russet, Tolman Sweet and many other winter apples in the above list; but time would fail us to notice all that deserve honorable mention.

We desire to add a word about the preservation of apples, and their conversion into that much abused, but when taken temperately, most healthful beverage, cider, but we fear we have already transgressed our limits. We must however express our honest convictions that the manufacture of cider is worthy of a more careful consideration by the farming community than it has hitherto received. The juice of the apple is capable of being converted into a beverage little if any inferior to that manufactured from the grape. The aroma of cider is not equal to wine, but the acid is congenial to most stomachs, and is a great promoter of digestion, and so far as health is concerned, we place cider above wine. When the price was one and two dollars a barrel, much care in its manufacture for a market was not justified, but now that the price is quadrupled, we hope to see unripe and rotten apples rejected from the pile which is to be ground for cider, and the use of musty straw entirely dispensed with. The musty barrel has also been tolerated equally with the musty straw. Let the principles of cider manufacture be studied as carefully as the principles of manufacturing wine—and they are nearly identical—and this branch of farming will take rank where it deserves.

For the Committee,

ALEXANDER HYDE, *Chairman.*

The Essay having been read and discussed, was laid over.

Mr. Birnie presented his Report as delegate to the Middlesex North Society, which was read and accepted.

Mr. Porter presented the following Essay, on

DRAINAGE.

The practice of draining is still in its infancy in this country, yet the time is not far distant, when it will be looked upon as a very important part of our agricultural operations. Thousands of acres in New England still remain unproductive, for the want of thorough draining.

In the management of soils it is necessary to their fertility to cause the rain water falling upon the surface to filtrate equally and readily to a proper depth, and to convey it away without allowing it to accumulate there. This is the object of draining. And it is accomplished in case of stiff soils, by causing the clay to shrink and become pervious through the joint action of the drains and evaporation, and in other wet soils merely by carrying off the surplus water below, thus enabling the quantity added above to penetrate regularly downward. When this result is attained, all other necessary improvements may be successfully carried out and the most profitable system of cropping adopted. A saving of seed, labor and manure will then be effected, and the numerous advantages arising from a dry and more friable soil will be secured.

The object sought to be obtained by various operations, as well as the circumstances to which such operations are applicable, would be made plain if the principles upon which the success of each operation depends were understood. The merits of subsoiling or deep ploughing, for instance, are often argued without reference to any principle whatever, and erroneous conclusions are no doubt frequently formed in consequence. Whereas, if the data necessary to lead to a correct view of the subject were examined, it would be observed that all soils liable to become too firm, require perhaps the application of all the means at the command of the farmer, to keep them open and to bring and return all their parts to the required depth under the influence of air and water.

The great object of draining and other improvements, is to promote fertility ; and subsoiling, and deep and perfect mixing and comminution of the surface soil must, as auxiliaries to thorough draining, be highly beneficial. If these prove inadequate, other means, such as the admixture of matter, will be required in addition.

If the soil is light and naturally porous, all its parts must be already more or less under the influence of air and water, and it possesses the advantages which subsoiling and deep tillage are calculated to confer. These operations would, therefore, be likely to prove less beneficial than in the case of stiffer soils.

Many soils, though absorbent in their natural state, are much benefited by deep ploughing or subsoiling, especially when green crops are to be grown, so that the ready filtration of water through them without draining is not an unerring test, as everything depends upon their nature, specific gravity, their locality, and the system of cropping and management. It is certain that some light soils require no deep stirring to keep them open, or to bring them into their utmost state of productiveness ; but, on the contrary, they often require compression and careful management to make and keep them sufficiently firm ; hence a heavy dressing of clay or marl which assists in consolidating them and increases their capacity for retaining water, as well as in supplying inorganic matter in which they are deficient, is often found to contribute greatly to their fertility, and to enable crops to be grown upon them, for which they would otherwise have been unsuitable. Thorough draining, however, by which the soil can be made perfectly absorbent and dry throughout, is of much greater importance than any other method, or than all other methods combined, as the necessary improvements can in most instances be effected by it alone.

This mode of draining has already been productive of immense advantage in those districts where it is generally applied, and on its extension and perfection the future success of farming in many places depends. Hence the importance not only of thorough draining being undertaken on all wet soils, but so as to make it fully and permanently equal to the purpose.

The first thing to be attended to in draining is to procure an outfall to carry off the water from the drains at any season. Without this they must be partially or totally inefficient, and it is scarcely possible that they can be permanent. In most places the only difficulty in providing an outfall, where one is not already provided, is the expense, which would often be considerable.

Draining, as a general rule, should be commenced at the lowest part of the ground; and when the water is effectually cleared away therefrom at all times, a good outfall will be easily obtained for the higher lands.

When the land is level it is important that ditches should not only be so situated as to allow the water to be easily and naturally brought into them and readily carried off afterwards, but that they should be cut to a regular inclination in the bottom, and their width suited to the quantity of water to be conveyed. The main ditches should be as straight as possible. Every deviation from the direct line increases the distance to the outlet and lessens the rate of inclination.

Every portion of the country appears to be abundantly supplied with materials of some description for draining. Where timber is scarce, stones are abundant; or, if both are wanting, then there generally is an excellent deposit of clay from which tile may be made. It is an established fact that under-draining will pay all reasonable expenses incurred in its construction in the course of three or four years, and not unfrequently the first year alone, by the increased productiveness.

It therefore behooves the farmer to consider well what kind of drains his present means will justify him in making. The digging and filling will cost about the same for any kind except tile. The difference in cost then will depend upon the material employed. If stones are to be hauled two or three miles, then perhaps wooden drains would be cheaper, and will last five or six years. But if stones are abundant on the field to be underdrained, or in the adjoining fields, it would perhaps be a matter of economy to employ the stone, for two reasons. First, stone will make a drain which will serve the object intended; and, second, the surface of the field will be cleared of a great nuisance and hindrance to a more perfect system of cultivation. Stone drains should never be made less than three feet deep and one foot wide at the bottom. Stone should be filled in to the depth of one foot at least, and then be covered with brush, straw, leaves, or some such material, so as to prevent the dirt from falling in and filling up the interstices.

The manufacture of drain tile has of late been very much on the increase, so that where material for the manufacturing is easily obtained they can be furnished at less cost than stone, and when laid down answer the object sought for perhaps better than anything. The cost at present is about two dollars and a half per hundred for three-inch tile, and less according to the size.

There is a new method of making tile from cement and gravel that I think supersedes all others for the main drain and outlet. These are made two feet in length, of any size, perfectly round, and when properly cured will last a lifetime. These are better adapted for conveying off surplus water than for draining, they being not so porous as those made with clay, and after being made a suitable time become very hard, almost like stone. The cost of these at the manufactory is considerably more than clay tile, perhaps twice as much; but considering their durability, I think them the cheapest for the main drain and outlets.

Perhaps, at this point, I can better illustrate this subject by giving an extract from the experience of one who has for over thirty years been intimate with all methods of draining. I refer to Mr. Johnston, of Geneva, N. Y. At one time esteemed a fanatic by his neighbors, he has come of late years to be generally known as the father of tile-drainage in America. After over thirty years of precept and twenty of example, he has the satisfaction of seeing his favorite theory fully accepted, and to some extent practically applied throughout the country. Mr. Johnston is a Scotchman, who came to this country over forty years ago, and purchased the farm he now occupies, on the easterly shore of Seneca Lake, a short distance from Geneva.

With the pertinacity of his nation, he stayed just where he settled, through ill fortune and prosperity, wisely concluding that, by always bettering his farm, he would better himself, and make more money in the long run than he could by shifting uneasily from place to place in search of sudden wealth. He was poor enough at the commencement; but what did that matter to a frugal, industrious man, willing to live within his means, and work hard to increase them.

His farm, the first purchase, was one hundred and twelve acres of land, well situated, but said to be the poorest in the county. He knew better than that, however, for although the previous tenant had all but starved upon it, and the neighbors told him such would be his fate, he had seen poorer land forced to yield large crops in the old country, and so he concluded to try the chances for life or death. The soil was heavy, gravelly clay, with a tenacious clay subsoil, a perfectly tight reservoir for water, cold, hard-baked, and cropped down to about the last gasp. The magician commenced his work. He found in the barnyard a great pile of manure, the accumulation of years, well rotted. This he put on as much land as possible, at the rate of twenty-five loads to the acre, ploughed it in deeply, sowed his grain, cleaned out the weeds as well as he could, and the land on which he was to starve gave him forty bushels to the acre. The result, as usual, was attributed to luck, and anything but the real cause. To turn over such deep furrows was sheer folly, and such heavy dressings of manure would not fail to destroy the seed. But it didn't; and let our farmers remember that it never will, and if they wish to get rich let them cut out this article, read it often, and follow the example of our Scotch friend.

This system of deep ploughing and heavy manuring, wrought its result in due time. Mr. Johnston, after seventeen years of hard work, at last found himself ready to incur a new debt, and to commence laying tile drains. Of the benefits to be derived from draining, he had long been aware; for he recollected that when he was only ten years old, his grandfather, a thrifty farmer in Scotland, seeing the good effects of some stone drains laid down upon his place, had said, "Verily the whole *airth* should be drained." This quaint saying, which needs but little qualification, made a lasting impression on the mind of the boy, that was to be tested by the man to the permanent benefit of his country. Without sufficient means himself, he applied for a loan to the bank of Geneva, and the president, knowing his integrity and industry, granted his request. In 1835 tiles were not made in this country. So Mr. Johnston imported some as samples, and a quantity of the horse-shoe pattern were made in 1838, in Waterloo. There was no machine for producing them, so they were made by hand, and moulded over a stick. This slow and laborious process brought their cost at twenty-four dollars per thousand ; but even at this enormous price Mr. Johnston determined to use them. His ditches were opened and his tile laid, and then what sport for his neighbors. They made fun of the deluded man ; they came and counselled with him, all the while watching his bright eye and intelligent face, for signs of lunacy. They went by wagging their heads and saying, "Aha!" and one and all said he was a consummate ass to put crockery under ground, and bury his money so fruitlessly. Poor Mr. Johnston! He says he really felt ashamed of himself for trying the new plan ; and when people riding past his house would shout at him, and make contemptuous signs, he was sore-hearted and almost ready to conceal his crime. But what was the result? Why, this: that land which was previously sodden with water, and utterly unfruitful, in one season was covered with luxuriant crops, and the jeering skeptics were utterly confounded that in two crops all his outlay for tiles and labor was repaid, and he could start afresh and drain more land. The profit was so manifest as to induce him to extend his operations each succeeding year, and so go on, until 1856, when the labor was finished, after having laid 210,000 tiles, or more than fifty miles in length. And the fame of this individual success going forth, one and another duplicated his experiments, and were rewarded according to their deserts. The horse-shoe tile was used by Mr. Johnston almost exclusively, for the reason that they were the only kind to be procured at first, and on his hard subsoil he found them all he wished for. He has drains that have been laid more than twenty years without needing repair, and are apparently as efficient now as they were when first laid.

His ditches are dug only two and a half feet deep, and thirteen inches wide at the top, sloping inward to the bottom, where they are just wide enough to take the tile.

Mr. Johnston says, tile-draining pays for itself in two seasons sometimes in one. Thus, in 1847, he bought a piece of ten acres, to get an outlet for his drains. It was a perfect quagmire, covered with coarse aquatic grasses, and so unfruitful, that it would not give back the seed sown upon it. In 1848 a crop of corn was taken from it, which was measured and found to be eighty bushels per acre, and worth at that time, one dollar per bushel ; this crop paid not only all expense of drainage, but the first cost of the land. Another piece of twenty acres, adjoining the farm of the late John Delafield, was wet, and would never yield more than ten bushels of corn to the acre. This was drained at a great cost, of thirty dollars per acre. The first crop after this was eighty-three bushels an acre. It was weighed and measured by Mr. Delafield, and the county society awarded a premium to Mr. Johnston. Eight acres and some rods of this land on one side averaged ninety-four bushels, or the trifling increase of eighty-four bushels per acre, over what it would bear before those insignificant clay pipes were buried in the ground.

Mr. Johnston says he never saw one hundred acres in any one farm, but a portion of it would pay for draining. Mr. Johnston is a hard-working Scotch farmer, who commenced a poor man, borrowed money to drain his lands, has gradually extended his operations, and is now at seventy-five years of age, written to by strangers in every State in the Union for information, not only in draining matters, but all cognate branches of farming. He sits in his homestead, a veritable Humboldt, in his way, dispensing information, cheerfully, through our agricultural papers and to private correspondents. His opinions are therefore worth more than those of a host of theoretical men, who write without practice.

HENRY S. PORTER,
For the Committee.

This Essay was read and laid over under the rule, when the Board adjourned.

FIFTH DAY.

The Board met at 10 o'clock, A. M., Mr. BIRNIE, of Springfield, in the chair.

The annual meeting of the New England Society being held at the same time, at the rooms of the Board of Trade, it was voted to adjourn to 3 o'clock, P. M., to give members an opportunity to attend.

The Board again met at 3 o'clock, when it was voted to appoint a committee of three to appear before the Committee on Agriculture of the legislature, with reference to the bounties of the agricultural societies. Messrs. Wilder, Thatcher and Watkins.

Mr. Birnie presented the following Essay, on

FALL AND SPRING PLOUGHING.

Such is the diversity of soil and condition of the farms of Massachusetts, that it is impossible to lay down any definite rules for ploughing, which is, undoubtedly, one of the most important operations in the cultivation of the soil. The success or failure of the crop depends very much on the time and manner of its accomplishment. Much has been said, and at one time it was quite fashionable, to recommend on all occasions deep ploughing; but in more recent discussions on this subject we notice that our most successful farmers advocate the medium depth of six to seven inches, under ordinary circumstances. But each cultivator will be governed by the nature and condition of his own soil and crop. When a greater depth than seven inches is desired for drainage or for some kind of root crop, we would recommend the subsoil plough, rather than turning the soil to a greater depth. It is the result of our observation that the roots of most of the crops cultivated in New England will be found within five inches of the surface; the tap-roots of some penetrate to a greater depth for moisture only; the nourishment of the plant is obtained in the warm surface soil. Hence the advantage of applying the manure as near the surface, as it is possible to incorporate it thoroughly with the soil; manure buried eight to ten inches deep is of very little benefit to the growing crop. We are aware that it is the practice of some of the most successful tobacco-growers of the Connecticut Valley to plough to that depth; but the quantity of manure applied is proportionately large, so that there is an abundance within five inches of the surface to supply the wants of the crop, and the balance is brought to the surface at the next ploughing. Their soil is a deep, sandy loam, with a subsoil that differs very little from the surface, except in its admixture with vegetable matter and cultivation.

In our climate, where we have but a few weeks in the spring to perform the various operations of carting out the winter accumulation of manure, ploughing and preparing the land for the crop, planting, sowing, &c., it is very desirable to do as much in the autumn as possible to relieve the pressure on those few exceedingly busy weeks. For that reason, if for no other, we would recommend to every New England farmer to do as much of his ploughing in the fall as he can find time to accomplish. Then he is comparatively at leisure, his teams are in good condition, the weather is cool, and both man and beast can perform more labor with less fatigue than in the spring.

Greensward should be turned in August or September, when the grass roots are in full vigor, and the weather is warm enough to produce immediate fermentation and decomposition of the vegetable matter contained in the sward. If not done as early as September, it should be left until late in the spring, when the grass is well started. We have for several years prepared our ground for oats and early potatoes in the fall, and have consequently been able to sow and plant as soon as the ground has thawed to a sufficient depth to allow the use of the harrow. The result has always been satisfactory. The earliest sown oats, other things being equal, have never failed to produce the best crop.

No doubt something may be done in the way of destroying worms and insects injurious to vegetation, that take up their winter quarters in the ground, by ploughing late in the fall. In that case, it is desirable to expose as much of the soil to the action of the frost as possible. In all fall ploughing we have found the best results from laying the furrow slice as nearly on edge as possible, or in other words, to expose the edge as well as the bottom of the slice to the action of the atmosphere. If any manure is left about the buildings, this is an excellent time to apply it to the newly ploughed ground. The frost and rains of winter will thoroughly dissolve and incorporate it with the surface soil, and all that remains to be done in the spring is to harrow and put in the seed.

Heavy clay soil should not be ploughed when too wet. If stirred when in that condition, it is apt to cake or press into hard lumps, which it is almost impossible to reduce until again exposed to the action of the frost. Such soil requires a very nice discrimination to determine at what degree of moisture it is proper to introduce the plough. If too dry a great addition of power is required to perform the same work.

We have a piece of land that was ploughed last autumn when too wet, and to aggravate the difficulty, the water stood on a portion of it until quite late in the spring. The result was that the surface ran together and baked to such a degree, that it was found impossible to pulverize it, and the crop notwithstanding a very bountiful supply of manure, was a perfect failure.
WM. BIRNIE.

After some discussion, the Essay was laid over for its second reading.

Mr. Clement then presented the following Essay, on

NIGHT SOIL.

In this paper we shall assume, or rather affirm that great negligence is manifest on the part of many persons, and whole families even, in not using the precaution which sanitary measures alone obviously require, in order to protect their homes against an atmosphere rendered offensive to the nostrils, pestiferous, malarious, through the proximity of putrescent matter.

Decaying vegetables, or fermenting and dissolving animal manure, unprotected, emit quite as much effluvia of that nature, and more even, than a tolerably well bred and reared gentleman can endure for a brief period of time without experiencing unpleasant sensations. Of necessity there must be either large or small accumulations of human excrements somewhere in the vicinity of every one's dwelling-place; hence the importance of having a suitably constructed vault under every privy.

While we are ready to admit that on the part of some, much precaution and good judgment has been exhibited in the preparation of this not to be omitted adjunct to every man's domicile, we as unhesitatingly assert that with many this sanitary measure seems not to have exercised their thoughts in the slightest degree.

"Little houses" we have not unfrequently observed standing out in bold relief and without any sort of an excavation in some instances, and in others the merest apology for one. In our judgment all such places should be complained of, or complaint entered against them under the act to protect the community against nuisances.

We have deemed it our duty to write somewhat pointedly because of the downright and palpable want of respect for and compliance with the laws of decency and propriety, which every one should observe, but to which many pay but little heed.

Let us now turn our attention to another aspect of the case.

That night soil is one of the more powerful stimulants to vegetable growth, it would seem to be an act of supererogation on our part to attempt to prove, for it is a fact conceded by every practical agriculturist who has had experience in the matter.

If proof should be demanded we can give our own experience and that of a score, more or less, of farmers who have used the article for many years.

That failures sometimes occur, in anticipated results, from its use may be attributable to two or more causes.

1st. The amount applied to a given amount of land may be, and in some instances has been too large. If there has not been much commingling of rain water or other weak liquids with the genuine article, we should say that one-fourth or one-third the amount in bulk which would be required in ordinary stable manure would be equally as good for an immediate crop.

2d. If for instance, a man, or men and team are sent to the city, being out two-thirds of the night and return with something like half a cord of slops, seven-eighths of which, or even more may be rain water or sink slops, and one-eighth or less the article which was sought, the result so far as paying for the labor is concerned will *not* prove in an eminent degree satisfactory. Again, if the application is made to warm and sandy soil and the season should prove *dry*, as we express it, probably a partial failure would ensue.

We have witnessed excellent results from an application to grass land as top-dressing; but from observation and experience we are led to believe that the safer and more economical, certainly the more sanitary, method of using, is to bury it in the soil with the plough, after mixing thoroughly with earth or peat, and just enough of either to facilitate the spreading evenly over the surface. Some prefer adding water and distributing broadcast directly from the cart, rather than compost before spreading. Some labor is saved by the last named method, which is worthy of consideration; and unless the material to be used contains some fertilizing properties, or the mechanical condition of the soil is improved by the addition, the extra labor may as well be dispensed with.

Every effort should be made on the part of citizens who expect tillers of the soil or others to act the part of scavengers, while they (the citizens,) are quietly resting on their couches, dreaming pleasantly, to facilitate the operation of clearing vaults by giving easy access, and also keeping tightly closed that water may not enter from the outside. It would seem to be the dictate of common sense that no pains should be spared in a dense population to prevent the escape of noxious odors which are liable, when neglected, to emanate from such depositories. When appropriate means are used to keep down offensive exhalations, the manure is correspondingly enhanced in value, so that two points are gained while aiming to secure the one which a salubrious state of the surrounding atmosphere imperatively demands.

Comparatively few, we apprehend, are aware of the great loss which is sure to ensue when the clearing of vaults, as they are ordinarily constructed, is not attended to in the spring or on the approach of warm weather, at which time fermentation and decomposition of privy deposits commences and progresses more rapidly than with any other manure. We have known instances where this clearing was omitted till autumn, and the additions were continually made through the summer; so large an amount had escaped by decomposition, evaporation and filtration, that scarcely more was then secured than might have been in the spring. Besides the waste and loss of nutriment to the soil which ought to have been saved and appropriated, the amount of air tainted by such exhalations will make a thoughtful and sensitive man shudder. Careless heedlessness, stench and waste are not productive of pleasant reflections, and we turn from them in disgust.

We have heard of a man whose family comprised four persons, and whose possessions in real estate consisted of one acre of land and dwelling-house upon the same. The land was mainly garden, on which the owner raised "truck" for the family, and the whole lot was kept in a good state of fertility with the excrements of the four bipeds composted with *two cords* of peat yearly. A supply of the last named article was kept constantly on hand, so that the vault received frequent additions. The chamber slops were all saved with care and thrown into the same general receptacle.

It need not surprise any one that two cords of excellent compost could be yearly made in that way, or that an acre of land could be kept in fine condition for the reception of seed by the yearly application of such a dressing.

Does any one complain that such is small business—that it is devoting much attention to a little matter.

Let us see how that is. Our wives, our daughters or our servant girls are continually engaged in what may appear in themselves as little matters. Sweeping a chamber, cleaning up a grease spot here, brushing down a spider's web there, washing a few dishes or taking a few stitches with the thousand and one little etceteras which have to be daily attended do, may not be regarded as of much consequence when separately considered, yet we all know that those things must be attended to promptly and in detail in order to make home appreciable. Now we are not sure that the gentleman of whom we have written devoted any more time or attention to his compost heap than sanitary measures would seem to demand. He certainly avoided all danger of complaint by the health officers, which cannot be said of all those who have "little houses."

In our limited travels we have seen many of those "houses" which were a big nuisance, and if complaint was not entered against them, somebody neglected a duty. Farmers, to be sure, are not often visited by health officers, but we do not believe in such a shadow of an apology as that for permitting what would be regarded as an intolerable nuisance in the city, to remain about their premises.

In this connection we will venture some wholesome advice in relation to this subject. If practicable, every farmer should have a *large* vault under his privy, the bottom and walls of which should be cemented and made water-tight. Let the vault be large enough to hold from one to two cords, according to circumstances, and extend back one way from the wall of the privy so far at least that a man can stand therein and shovel with convenience to himself. Let a pile of peat be kept at hand, that a little may be used often, by raising the trap-door or scuttle to the vault, and closing the same after use.

We write of peat because we regard that article as among the cheapest and best deodorizers and absorbents that can be obtained for such a purpose. Where peat is not to be obtained without great cost use any earthy substance which may be procurable. Better use dry clean sand than nothing; but whatever may be used let there be as little water in it as is practicable. The more free from water the substance used the less will be required to absorb the liquids. If shelter from storms cannot be provided for the material to be used, have it thrown in after a few days of dry weather.

Coal ashes may frequently be had in a dry state, and make a very good absorbent. Vast quantities of coal are used in all our cities or wherever fuel is purchased, used in furnaces in cellars and the ashes sifted in the cellar or shed, and may be preserved in barrels or boxes for winter use when other articles may be difficult of access. While there may not be much in the ashes alone to recommend them as a manure, they will serve to retain the nutritive properties of night-soil.

We would be particular in relation to using something with which to cover up, and that quite frequently the contents of our vaults, for two reasons: First, we know that great loss in fertilizing properties is the legitimate result when this is neglected; and secondly because that masses of putrescent matter in a state of fermentation fill the air with odors offensive to the nostrils and deleterious to health, all of which can and should be avoided.

If a family of four persons can keep an acre in a productive state, it follows that a family of eight souls could fertilize two acres with the same facility.

Scattered over the hills and through the valleys of Massachusetts there are hundreds of families, each containing eight or more persons, neither of which families save dressing enough in the manner indicated, to fertilize a small garden patch, never dreaming by day or night of improvidence, waste or stench. Thus, it should *not* be. Much of our soil is fast losing its productiveness through the "skinning" process; soil, too, that would now be yielding abundant harvests but for the shabby treatment bestowed upon it.

Large tracts of land, and smaller, are already run so low that we know of no conceivable way to renovate them, other than give them over to the growth of forest trees, which is a slow but rather sure process of renovation.

Massachusetts farmers, New England farmers should awake to this subject much more generally than they do, and see to it that not only the night soil but everything which can be made to nourish growing plants, is saved and in a manner that the vitalizing air which we must all inhale is not unnecessarily contaminated with hurtful effluvia.

The half civilized Chinese are at least a century in advance of us Yankees in some practices pertaining to agriculture. Careful are they to collect and save every material which will fertilize the land, even to the hair and shavings from the barber's shops. Is it a wonder that the whole surface resembles one vast garden ? Or that where the people are so thoughtful about gathering all materials which could possibly taint the air or enrich the soil in which it is buried with care the appellation of "celestials" should be applied to them ? The difference between the Yankees and celestials in this respect may be accounted for, in the fact that the former have had a large amount of virgin soil to resort to, while the latter are comparatively circumscribed as to territory, and are obliged to husband all their resources in order to support the people of the empire. With flour at eighteen dollars per barrel, eggs at fifty cents per dozen, butter at fifty cents per pound, sirloin steaks at forty cents, board at the house of a publican (common at that,) three dollars and fifty cents per day, would seem to indicate that the time has arrived when Yankees may as well husband their resources, especially those which will pay in a sanitary point of view, besides rendering the products of the soil more plentiful and cheap.

If, in this writing, we have introduced subjects not strictly relevent, our apology must be that in our earnestness and zeal, whenever the matter of enriching the soil is discussed in our presence, rises almost to enthusiasm; aye, quite up to that point, when we are permitted to participate in the discussion. We cannot now close without making one earnest appeal to our city friends to be more provident and careful to save what is named at the head of this writing, and in a manner that it may be conveyed to the soil without loss to him who performs the (in some respects,) disagreeable labor, or cease to complain of high prices of farm products.

We firmly believe in a law of compensation; that God has wisely ordered that the ground on which we tread shall produce an abundance for the use of man and beast so long as an appropriate return is made therefor; that this return is to be made in just such materials as is not healthful or agreeable remaining above the surface of the earth. Decaying vegetables and plants of almost every description can be used for plant-food. The excrements, both solid and liquid, of all animals are at present our great dependence.

Dead animals, not to be used for food, should always, if practicable, become an ingredient in the compost heap, and well covered and encircled all round with earthy substances. Decomposed flesh is the most powerful of all fertilizers, and next that which is available to us in quantities which renders it of much account, in point of concentrated fertility, is night soil. We therefore urge upon all, whenever and wherever practicable and feasible, to let as little of the article be lost, and save as much as possible under existing circumstances.

Cheap and wholesome food is by the middling and poorer classes always received gratefully, and it is those classes which in the main produce the wealth of the nation, drawing it directly or indirectly from mother earth. Let us therefore keep up the reciprocity, returning to the mother all which she has a right to claim in order that she may yield an abundance for the sustenance of her children.

Asa Clement,
For the Committee.

The Essay, having been read, discussed and laid over, Mr. Bull was appointed a Committee on Credentials of new members, when the Board adjourned.

SIXTH DAY.

The Board met at 10 o'clock, A. M., Dr. LORING in the chair.

Present, Messrs. Baker, Bassett, Birnie, Boise, Brown, Bull, Clark, Clement, Cole, Durfee, Fearing, Hyde, Hubbard, Johnson, King, Knowlton, Loring, Moore, Morton, Pierce, Porter, Saltonstall, Sanderson, Slade, Thatcher, Thompson, T. W. Ward, H. S. Ward, Watkins and Wilder.

Mr. Bull, from the Committee on Credentials, reported as follows:—

The Committee on Credentials have attended to the duty assigned them, and respectfully report the following as duly elected members of this Board:—

LEVERETT SALTONSTALL, by the Massachusetts Society for Promoting Agriculture.
ASA CLEMENT, by the Middlesex North.
NEWTON S. HUBBARD, by the Worcester South.
JOHN A. MORTON, by the Hampshire.
IMLA K. BROWN, by the Franklin.
C. C. BASSETT, by the Worcester North-West.
E. W. BOISE, by the Union.
ALBERT FEARING, by the Hingham.
GEORGE M. BAKER, by the Marshfield.
GEORGE A. KING, by the Barnstable.
JOHN PIERCE, by the Martha's Vineyard.
MARSHALL P. WILDER, appointed by the Executive.

(Signed,) E. W. BULL, *Committee.*

The Report was accepted.

A Committee, consisting of Messrs. Bull, Hyde and Moore, to which was referred the mode of ascertaining the yield of crops by weighing and measuring, submitted the following amendment to the printed blank to be used by each society:—

"The committee to whom is intrusted the award of premiums on field crops, may award the premiums according to their judgment; but, for the purpose of furnishing accurate statistics for the benefit of agriculture, shall select certain of the crops, and require the owners thereof to measure the land and weigh the crops accurately, and give all possible information thereon over their signatures, and return the same to the secretary of the society, to be published in the annual transactions."

This amendment was adopted.

A Committee of three, consisting of Messrs. King, Fearing and Sanderson, to fix and determine the time of holding the Fairs of Societies, reported as follows:—

The Union Society, at Blandford, shall begin its exhibition on the Wednesday after second Thursday of September.

The Hingham Society on the last Tuesday of September.

The Marshfield on the first Thursday of October.

The Worcester North-West on the third Tuesday of September.

The other societies on the dates hitherto assigned by the Board.

GEORGE A. KING, *Chairman.*

The Essay on Manure and its Application was taken from the table, discussed and adopted.

The Essays on Hedges and Farm Fences, on Night Soil, on Fall and Spring Ploughing, on Fruit Culture, on Specialties in Farming, and on the Hay Crop, were severally read a second time and adopted.

The Report of Mr. Cleaveland, as delegate to the Hoosac Valley Society, was presented and accepted.

Mr. Johnson presented the following Essay, on

IMPROVEMENT OF STOCK.

The subject of farm stock is one of the highest importance to the farmers of New England.

To secure that degree of improvement in the cattle of this section so desirable to our highest interest, and to approach that state of perfection which characterizes the stock of England, Scotland and Holland, this subject must more engage the attention of our farmers, and the principles of close and special breeding be studied with greater care, and carried with more precision and persistence into practice.

I am aware that many, and perhaps most of our farmers, do not regard similarity of color, style and general appearance of their herds, as worthy of that consideration which the English breeder deems a matter of great importance. But visit a herd of recently imported Jerseys, and observe that striking similarity of color, with those general characteristics which distinguish this breed in its purity, and we cannot withhold our admiration nor pass by this peculiar attraction as one not worth preserving —but which, if lost through two generations by inattention to those principles in breeding by which they may be retained, cannot be regained but by a new importation.

This loss, perhaps, may not particularly detract from the dairy qualities of the animals—but who would not prefer to pay a higher price for those selected from a herd where this similarity, characterizing any desirable breed, is most perfect?

How may these distinguishing points in similarity of color, general appearance and character be preserved? This may be secured, in my opinion, with great certainty, by sedulously keeping our herd composed only of animals of the same breed, entirely separate and distinct from the society and influences, and, as far removed as possible from the neighborhood and view of other breeds of cattle; thus endeavoring to close every avenue whereby any species of contamination may creep into and disturb its peculiarity, purity and that uniformity so highly pleasing to the eye.

Have we not observed that, when cattle of different breeds, however pure and beautiful in their distinctive external traits, occupy adjoining pastures, or the same barnyards, or are tied in the same stable-range, although copulation between the different breeds is entirely prevented, still, that under these circumstances, and by these influences, the offspring of either breed, in many instances, do not very closely resemble the parents in point of feature and mark, but partake of those which belong to, and distinguish their companions?

With this disregard to the influence of society upon the character of our herds, we cannot reasonably hope to retain that similarity among them which distinguishes those of England and Scotland where each breed is kept separate and distinct from other cattle.

In the selection of a breed of cattle we should first consider the adaptation of our climate and soil to any particular breed, together with our market facilities.

If we decide to make beef we would not select from the Jersey as favorable to our object, but rather adopt the Shorthorn, Devon or Hereford; our selection from either of these varieties being influenced by our ability to feed large or small cattle most profitably.

If milk in large measure is desirable the Devon will be passed by, and our attention arrested by the Ayrshire, a variety which has been bred with regard to this specialty during the last seventy-five years, and which doubtless promises a larger return for the cost of keeping than has hitherto been obtained from any other. But if circumstances indicate that butter may prove more remunerative than either milk or beef, no one would hesitate in making a choice, since I think it is acknowledged that the Jersey, for quality of butter, and for peculiar richness of milk desirable for family use, stands as yet unrivalled.

Our choice of breed having been decided, we should be governed, in the selection of the animals to compose our herds, for whatever specialty designed, by certain rules. First, we should look for those possessing similarity of color, style and general appearance; whose skins are thin, soft, silky and elastic, and whose eyes are large, mild and bright.

Those intended for milk should carry the unmistakable external appearance, in every point of form and development, of being good milkers; and each should be selected from a line of ancestors, through many generations back, that have been *bred* and *fed* with a view to this specialty, and to develop this quality in its highest degree of perfection.

Indeed, I believe the special character and quality of all breeds of stock, in large measure, depends upon the food they receive, together with their general management during the period of breeding, and continually through a succession of many generations.

Breeders for the dairy should be fed with regard to this specialty, and that their offspring, even during the period of gestation, may be brought under all the influences tending toward this result.

Calves should nurse until the udders of their mothers are all right; and then, on weaning, should receive milk and oatmeal gruel until dry meal or some oats, with water for drink, may be allowed.

On dispensing with milk, still continue oats in some form, allowing rowen, fine clover hay and some roots for a time; then, on being turned into an inclosure of sweet grass, so near the barn that shelter, during night and storms may be easily afforded, dispense with hay and rowen, but continue feeding with small quantities of oats or roots, and a trifle of Indian meal through the summer and autumn.

During the first winter they should receive careful attention; being provided with warm, cleanly and well ventilated stables, and fed on clover hay and rowen with oats in some form daily, together with a supply of some kind of roots; adhering strictly to the principle of regularity in times of feeding.

Through the succeeding season care should be taken to provide for them pastures yielding plenty of nutritious grasses to assure their rapid growth and free development.

Similar care is requisite during the second winter, and a continuance of the same kinds of food should be allowed, with such increase in quantity as advancement in size and circumstances demand.

Thus, I would feed both male and female from the first day of birth, with a view to secure a full development of milk-producing qualities. In this manner a large growth, in most cases, will be attained at two years of age.

It is preferable that heifers, having attained sufficient growth by this mode of feeding and management, should come into the dairy at two years of age. But in this case it is advisable to suffer them to remain farrow during the succeeding year for the purpose of affording greater opportunity for development, and the acquirement of a higher state of maturity than would otherwise be attained. But I would avoid raising the calves of two-year-olds, as I would those from old and exhausted cows; believing the practice in either case, if continued, will produce specimens of stock wanting in the essential of vigor and strength of constitution, and must be attended by fatal deterioration and consequent disappointment in the character of our stock; differing materially from that raised from parents having attained the most perfect period of life.

Males do not acquire the highest degree of vigor, strength of constitution, and power to transmit the most perfect qualities of their blood to offspring, until in most instances, they are four or five years of age; and hence should be held in reserve for purposes of breeding until this age and peculiar condition of fitness have been acquired.

At this period of maturity we may bring them into use with great assurance of realizing our highest hopes and most reasonable expectations in the gift of purity, beauty of type, precision of color, excellence of quality, and that high future promise to their progeny, so gratifying to every tasteful breeder of stock, and every seeker for the highest certainty of success and improvement.

The physical system and constitution of very young males is undeveloped; and in their use we constantly breed weakness, and are sure of reducing the standard of strength and vitality of our herds.

We should never be shy of keeping a good bull because no immediate income is derivable from him. He is surely the foundation, the corner-stone and source of all improvement in our neat stock, and no one animal pays so well ultimately for keeping, or occupies a station on the farm so important or responsible.

No stock-bull should be allowed to serve more than fifty cows during a season.

With due regard to care in the management and feeding of stock, and by close attention to the principles of breeding, it will not be many years before the farmers of this country may secure breeds of cattle which will well compare, in points of purity and excellence of quality, with those of Jersey or Ayrshire; and in some respects must prove superior.

The same *care* is requisite in selection of stock to fulfil the intention of butter or beef; and each herd requires to be fed with a view to secure the particular specialty desired.

All farmers may not wish to raise and keep blood stock; but there can be no doubt that the dairy, either for the product of milk or butter, is by far the most profitable department for the farmers in the eastern part of Massachusetts to pursue, and therefore, deserving their especial consideration.

That we have already achieved great improvement in farm stock, no doubt can be expressed when the facts set forth in the statistics are examined.

In 1855, the valuation of the cows and heifers in the State was, $4,892,291; and in 1865, it was $6,537,634; showing an increase in ten years of $1,645,343.

In 1855, the value of the product of dairy cows, in milk, butter and cheese, was $2,898,696; and in 1865, it was $3,091,462; showing an increase in the products of the dairy to the amount of $192,766. It is probable that the increase in the products of beef and veal have been equal to that of the dairy. This sum, added to that in valuation and income, above recited, amounts to $2,030,871.

In view of this achievement within ten years, embracing that unhappy period of time when the war necessarily engaged much of our attention, bearing heavily upon our energy and means, and the advancement of our farming interests, what may we not anticipate will be the results of our efforts in this direction during the next ten years, which we sincerely hope may be crowned by the blessings of smiling peace.

Some farmers, as we have observed, are not disposed to raise pure blood stock. But, surely, all must desire to improve the herds we already have. Indeed, I incline to the belief that, wherever much improvement upon our original stock is noticed, close inquiry will disclose the fact that a *blood bull* has been entertained in those districts to the exclusion of an inferior "*scrub!*" The latter should be more generally discarded by our intelligent farmers.

We know that even a *veal calf* from a blood bull commands a higher price in the market than one from an ordinary specimen, to say nothing by comparison in regard to the marked superiority of those intended for the dairy who carry a large strain at least of pure blood.

The maxim in breeding, that "Like produces like," being obviously true, it is, therefore, highly important that we introduce blood bulls into the society of our herds, whereby we may secure a large infusion of the best blood. We know that grade cows are vastly superior for the dairy to those bearing no relation to purity of blood.

By bringing our best cows thus under these influences of improvement, feeding at the same time with especial regard to this object, we shall obtain results decidedly favorable to our advancement, and highly satisfactory.

But, suppose it may cost *more* to raise stock of this improved character, to furnish our farms with the requisite number, than to purchase promiscuous specimens in the market, as some farmers argue, the superior quality of those raised under our own management, will more than balance the extra expense of raising, if any attends the practice.

The motto of every intelligent farmer should be that he will raise his own stock; and, as far as practicable, all those products of the soil required for the maintenance, and conducive to the highest state of development and profit of his herd.

Respectfully submitted,

John Johnson, Jr.

Framingham, February 1st, 1868.

This Essay was accepted.

Voted, To assign the delegates to attend the exhibitions of the year as follows: —

Essex, at Newburyport, Sept. 29 and 30,	I. K. Brown.
Middlesex, at Concord, October 1, 2 and 3,	Nathan Durfee.
Middlesex North, at Lowell, Sept. 23 and 24,	George B. Loring.
Middlesex South, at Framingham, Sept. 22 and 23,	James Thompson.
Worcester, at Worcester, Sept. 17 and 18,	Albert Fearing.
Worcester West, at Barre, Sept. 24 and 25,	M. F. Watkins.
Worcester North, at Fitchburg, Sept. 29 and 30,	C. C. Bassett.
Worcester North-west, at Athol, Sept. 15,	Leverett Saltonstall.
Worcester South, at Sturbridge, Oct. 1,	T. D. Thatcher.
Worcester South-east, at Milford, Sept. 29 and 30,	J. Pierce.
Hampshire, Franklin and Hampden, at Northampton, Oct. 1 and 2,	C. G. Davis.
Hampshire, at Amherst, Sept. 29 and 30,	E. W. Boise.
Highland, at Middlefield, Sept. 10 and 11,	A. P. Slade.
Hampden, at Springfield, Oct. 6 and 7,	William Knowlton.
Hampden East, at Palmer, Oct. 13 and 14,	George M. Baker.
Union, at Blandford, Sept. 16 and 17,	J. A. Morton.
Franklin, at Greenfield, Sept. 24 and 25,	George A. King.
Berkshire, at Pittsfield, Oct. 6, 7 and 8,	Thomas Billings.
Housatonic, at Great Barrington, Sept. 30 and Oct. 1 and 2,	E. W. Bull.
Hoosac Valley, at North Adams, Sept. 22, 23 and 24,	H. S. Ward.
Norfolk, at Dedham, Sept. 17 and 18,	N. S. Hubbard.
Marshfield, at Marshfield, Oct. 1 and 2,	Asa Clement.
Bristol, at Taunton, Oct. 6, 7 and 8,	C. Sanderson.
Bristol Central, at Myrick's, Sept. 17 and 18,	William Birnie.
Plymouth, at Bridgewater, Sept. 24, 25 and 26,	H. S. Porter.
Hingham, at Hingham, Sept. 29 and 30,	T. W. Ward.
Barnstable, at Barnstable, Oct. 13 and 14,	Alexander Hyde.
Nantucket, at Nantucket, Sept. 30 and Oct. 1,	J. Johnson, Jr.
Martha's Vineyard, at West Tisbury, Oct. 20 and 21,	J. L. Cole.

The Examining Committee of the Agricultural College was constituted by the appointment of Messrs. Agassiz, King and Moore.

The Essay on Drainage was then read by its title, and adopted.

The Committee on Meetings was constituted by the appointment of Messrs. Clark, Hubbard, Moore, Birnie, and the Secretary.

The Committee on Printing was constituted by the appointment of Messrs. Porter, Knowlton, Moore, Loring and the Secretary.

Adjourned.

SEVENTH DAY.

The Board met at 10 o'clock, A. M., Mr. THOMPSON, of Nantucket, in the chair.

Mr. Johnson, from the Committee appointed to consider and report a list of subjects for investigation, and to assign such subjects to appropriate committees, submitted the following:—

Abortion in Cows.—Messrs. Brown, Billings and Thomas W. Ward.

Theory and Practice.—Messrs. Saltonstall, Bassett and Boise.

Amending Soils by Mechanical Means.—Messrs. Sanderson, Morton and Baker.

Cultivation of Cereals.—Messrs. Knowlton, Clark and Pierce.

Climate as affected by Soil and Location.—Messrs. Bull, Hyde and Thompson.

Preparation of the Soil for Seed.—Messrs. Watkins, Davis and Durfee.

The Best Method of Feeding Dairy Stock.—Messrs. Thompson, King and Hyde.

The Time of Cutting and Mode of Curing Hay.—Messrs. Johnson, Fearing and Moore.

Road Building and Repairing.—Messrs. King, Ward of Monson, and Cole.

The Small Fruits.—Messrs. Slade, Thatcher and Birnie.

Sand for Bedding and Compost.—Messrs. Birnie, Knowlton and Billings.

Domestic and Factory Dairies.—Messrs. Thatcher, Hubbard and Porter.

Improvement in the Management of our Agricultural Societies.—Messrs. Loring, Johnson and Brown.

The Breeding and Training of Horses.—Messrs. Porter, Ward of Shrewsbury and Sanderson.

The Potato Crop.—Messrs. Hyde, Slade and Watkins.

Waste of Manures.—Messrs. H. S. Ward, Cole and Davis.

Farming as an Occupation—its Advantages as compared with other business.—Messrs. Hubbard, Brown and Bull.

Commercial Manures.—Messrs. Clement, Morton and Boise.

Relation of Manufactures to Agriculture.—Messrs. Durfee, Fearing and Baker.

Fruit Culture and its Preservation.—Messrs. Wilder, Clement and Pierce.

Draining, its Effects upon the Soil and Crops, and the Cost of the Different Methods.—Messrs. Moore, Loring and Pierce.

Nature's Methods of Distributing Plants.—Messrs. Clark and Wilder.

This Report was accepted and adopted.

Voted, To appoint a committee of three to examine and report upon the construction of a barn.

This Committee was constituted by the appointment of Messrs. Hyde, Loring and Moore.

After referring all unfinished business to the Committee on Printing, the Board adjourned.

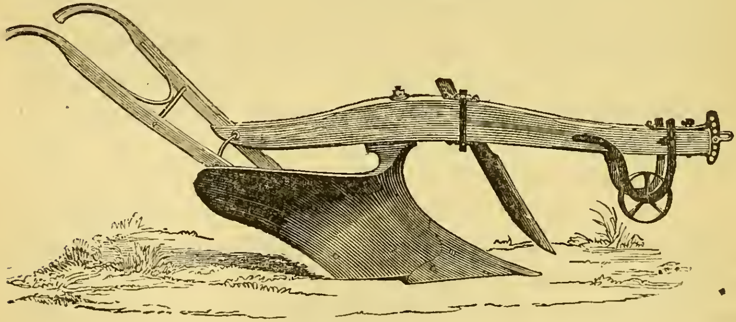
THE FAIRS.

The exhibitions of the various agricultural societies have been numerously attended during the year, and their influence has been as widely felt as in any former period of their history. These fairs offer the most ample facilities for bringing to the knowledge of the people the vast improvements which are taking place in all the departments of farm economy.

In looking over the returns of the county societies, it is gratifying to find that the department of agricultural mechanics has by no means fallen behind any other in extent or interest. Novelties are not, to be sure, always improvements; but every improvement implies a novelty, whether it be in a new principle applied, or in an old, well-established principle applied in a new form, or to effect a new and hitherto unattained object. The fact that our ingenious inventors and our skilful mechanics appreciate the advantages which the exhibition affords of bringing their implements to the knowledge of the public, is fully shown by the large number of entries in this class on the books of the societies.

In implements for stirring the soil, the plough still maintains its position as the fundamental implement of husbandry. The iron has, in many instances, been substituted for the wooden beam, and it is probable that the time will come when the objections to it will be removed from the minds of our farmers. It is somewhat heavier, to be sure, but that scarcely increases the draught, while the strength and durability attained must be regarded as an advantage. Still it is evident that, for the present, we shall adhere to the wooden frame as being the least costly, more yielding and flexible, and somewhat lighter to handle.

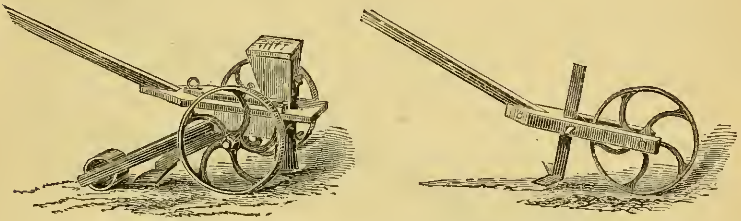
At the discussion at Concord, some members of the Board spoke of the practical utility of the Doe plough, which has reached a high reputation in some sections of the State.



DOE PLOUGH.

This favorite plough, if not the best as a stubble or as a sod plough, has a wider range of adaptation than many others, and has the credit of doing admirable work in a great variety of soils and circumstances. The farmer cannot always afford to own a plough especially and perhaps best adapted to stubble and another particularly suited to sod ploughing. He wants one that will do good work wherever it is placed. This plough took the first premium at the New England, and at some of our county fairs. It is manufactured by Whittemore, Belcher & Co., at Chicopee Falls, and sold at their warehouse, 34 Merchants' Row, Boston.

A very neat and efficient seed-sower was exhibited and took the premium at the Essex Society. It is known as the Improved Danvers Seed-Sower, manufactured by G. E. Herrick, of Lynnfield Centre, and sold by Messrs. Parker, Gannett & Osgood, at 49 North Market Street, Boston.

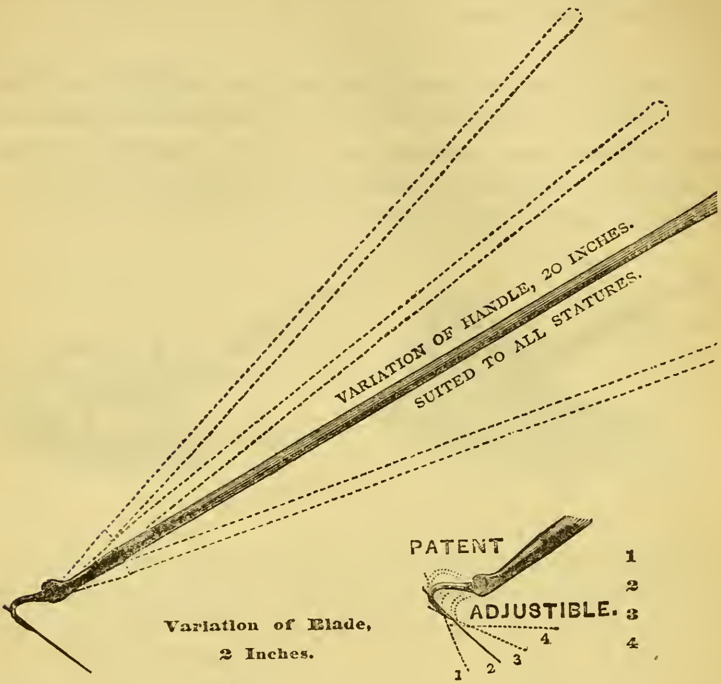


IMPROVED DANVERS SEED–SOWER AND HOE.

It sows onions, turnips and other similar seeds with great uniformity, and mangolds and other varieties of beets, and parsnips, carrots, &c., as well as any machine with which I am practically acquainted. It is to be recommended for its simplicity and cheapness, a feature of no little importance, as it insures its use in many hands where a more expensive machine would not find its way.

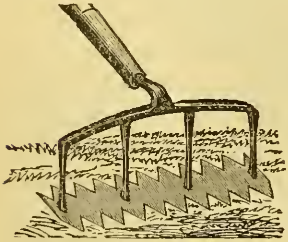
Our hoes have generally been thought to be all that could be desired as respects lightness, beauty of finish and durability. As compared with a similar class of implements that I have ever seen in any other country, they are unsurpassed. But it is well known that a hoe that is well adapted to a man or to a tall person is not always so conveniently worked by a boy. An attempt has been made to remedy this difficulty by attaching an adjustable shank by which the hoe can be "set" or adapted to different statures.

By this simple arrangement the hoe can be made to hang to suit the operator, and held firmly by a nut. In other respects it is like the common hoe, light and substantial. It appears to be a convenient invention, and has received the sanction of a premium by the New York State and the New England Agricultural Societies. It is patented by Dr. J. C. Plumer, of Boston.


VARIATION OF HANDLE, 20 INCHES.
SUITED TO ALL STATURES.
Variation of Blade,
2 Inches.
PATENT
ADJUSTIBLE.
1
2
3
4
1
2
3
4

PLUMER'S ADJUSTABLE HOE.

Another simple but effective and valuable implement is a weeding hoe invented by George P. Allen, of Woodbury, Conn. It is a scuffle hoe to be worked back and forth between the rows of vegetables, or in garden or other walks, running just beneath the surface. The zigzag or serrated edges of the blade greatly increase the cutting surface, and make it easy of operation and useful in destroying weeds.



ALLEN'S WEEDER.

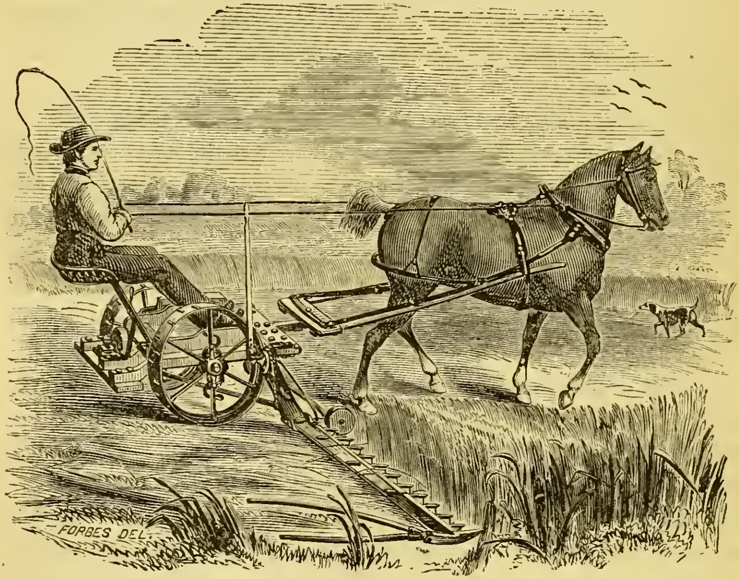
No branch of agricultural mechanics, if we may judge from the implements exhibited at the fairs, has made greater progress in improvement than that of machines designed for the hay harvest, the cutting and curing of grass. Power in this direction has been vastly multiplied by machinery within the brief space of ten or fifteen years. These improvements, moreover, have been steadily progressive. We now have mowers of easy draught and that do the work well—most of them, in fact, better than it could be done by the hand-scythe.

The past year has recorded the triumph of American mechanics at the Exposition at Paris. It was an American machine that took the lead of all others on the field, and won for its ingenious inventor, Walter A. Wood, of Hoosick Falls, N. Y., not only the grand gold medal for perfection of work and another for superiority of mechanical construction, but also the decoration of the Imperial Cross of the Legion of Honor. This must be regarded as a national triumph in which every American must feel a just and natural pride. [See Frontispiece to the Abstract of Returns.]

This new jointed-bar mower runs upon two driving-wheels, each of which has an internal gear which connects with ratchet-gear wheels, making each an independent driving-wheel. These wheels are so placed as to run in the tracks made for them by the track-clearer so as to avoid running over the grass that has been cut. The spring seat is so placed that the driver's weight balances the weight of the tongue, leaving no pressure upon the necks of the team. A new lever arrangement is attached to raise the finger-bar in passing obstructions and to hold it at any height, raising both ends of the bar at the same time. The arrangement for throwing in and out of gear is also very simple and convenient. The guard-fingers are made of malleable iron faced with steel plates riveted securely and attached to the bar by bolts, by means of which they can be readily removed or replaced. The frame is of wood, this having been found by experience to be altogether the best material. The bar is sufficiently strong to stop the team in case of striking any obstacle, and still elastic enough to fly back to its position when the strain is removed.

This machine took the first premium of the Essex, the Berkshire and other fairs. Fully a hundred thousand have been built and sold, and it is estimated that at least fifty thousand were used in the harvest of last year. It is made at Hoosick Falls, N. Y. The Boston agents are Messrs. Whittemore, Belcher & Co., 34 Merchants' Row.

Many improvements, also, are noticeable in the celebrated "Buckeye" mower, a machine well known to the farmers of this State. The draught has become easier, while the strength and efficiency are retained. It was built the last year from entirely new patterns, adopting a new style of inside shoe, and doing away with the spring keys for fastening connection with the scythe, new ratchet lever for raising the finger-bar, new gearing throughout, narrower sections, increase of speed, and a new shipper for throwing out of gear. The result is a smoother cut, a lighter draught, and greater ease in raising the finger-bar. The liability of breaking the finger-rods is also lessened, and it is easier to take out and replace any parts when necessary. This machine took the prize at the great trial of mowers and reapers at Auburn, N. Y., in 1866, being awarded the gold medal as the best mower at the trial.



THE BUCKEYE MOWER.

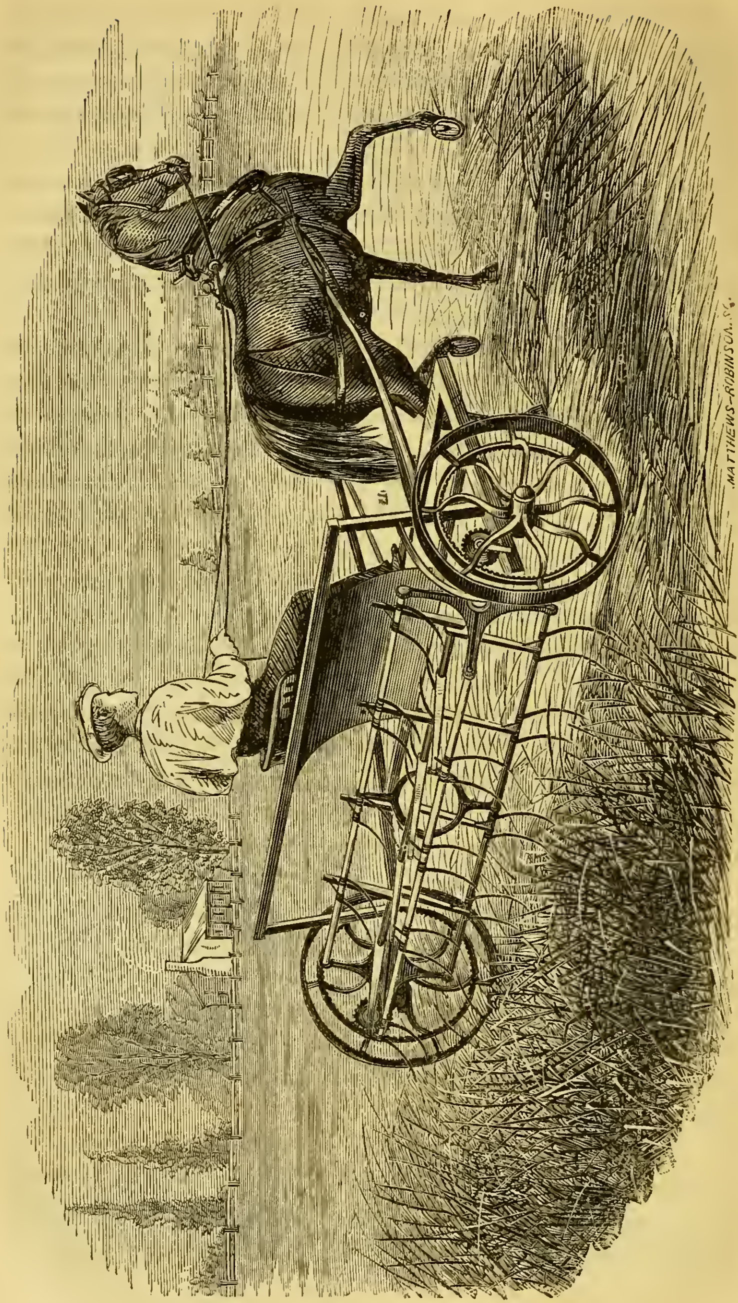
The knives of the Buckeye are tempered by a process which secures uniformity, all being alike, a result which cannot be secured by the ordinary process of tempering. The advantage of this cannot be overestimated.

The Buckeye is manufactured by the Buckeye Mowing Machine Company at West Fitchburg, under the practical and skilful hand of A. B. Barnard, Esq., the works themselves being a marvel of ingenuity. The Boston agents are Parker, Gannett & Osgood.

The hay tedder naturally follows the mower. This is a comparatively new machine in our hay fields, but the advantages of its introduction have become so apparent that it has rapidly gained favor, and the number of machines sold has been large, and is increasing every year.

The new system of hay-making which was inaugurated by the invention and use of the horse-rake and the mower, was not complete without some other machine to enable the farmer to cure the large amount of grass which the mowing-machine could readily cut. There was still more or less dependence upon hired men, notwithstanding the immense saving of labor in cutting and raking. The hay tedder comes in to meet this difficulty, and it has relieved many a household of the care and labor and anxiety which always came with this busy season of the year. Those who have used a tedder, so as to be able to appreciate the immense saving of labor which it secures, and the many incidental advantages which this saving has brought with it, are unanimous in the opinion that it is of nearly equal importance with the rake and the mower; and I have heard farmers declare that if they must dispense with either, it would be with the mower rather than the tedder.

The first machine of this kind used in this State, so far as I am aware, was imported from England. But, like most English machines, it was of heavy draught and unnecessarily cumbersome. It was used sufficiently, however, to show the importance of such an implement. Spreading swaths and turning hay, though light, is slow work; but it is precisely this kind of work where animal power comes in to multiply the power of hand labor many times. The tedder, for instance, will do the work of from twelve to fifteen men in the same time, so that the necessity of extra help is dispensed with, and the hay is cured with greater rapidity and greater certainty, often, by this means, avoiding exposure to showers or wet weather and the injury to result from it.

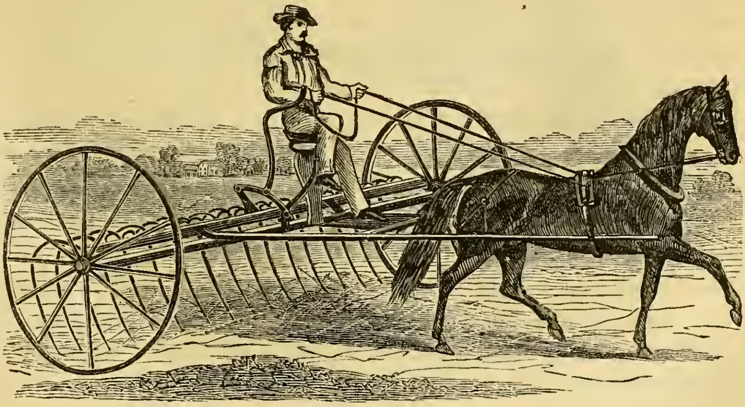

MATTHEWS-ROBINSON. SC.

THE AMERICAN HAY TEDDER.

In fair weather, for instance, a boy and a horse can cure all the grass that can be mown by the machine in the morning, so that it will ordinarily be fit to go into the barn in the afternoon of the same day. Grass kept lightened up to the sun and air dries quickly. The tedder may be put into the field as soon as the mower has left it, and kept in operation till the whole crop is properly cured, giving ample time to rake and load. Indeed, when the advantages of this implement are better known, it will probably come into very general use as an indispensable labor-saving machine.

The American tedder is mounted on two driving-wheels. It is rigged with sixteen spring forks, attached in an ingenious manner to a light reel. The forks revolve very rapidly even while the horse is going at a slow walk, and it runs without noise. It is so simple that a boy can operate it, nothing being required but to sit and drive with both hands free. The draught is easy. This machine is manufactured by the Ames Plow Company, and is for sale at their warehouse at Quincy Hall, Boston.

The horse-rake was one of the first inventions designed to relieve the severe labor of hay-making, and it must be regarded as one of the most important, second only to the mowing-machine. Many patents have appeared, each one possessing, no doubt, some advantages peculiar to itself. Two or three new claimants for popular favor appeared at the fairs last year, and they are worthy of mention. One of these is the Whittemore Self-Locking Rake.



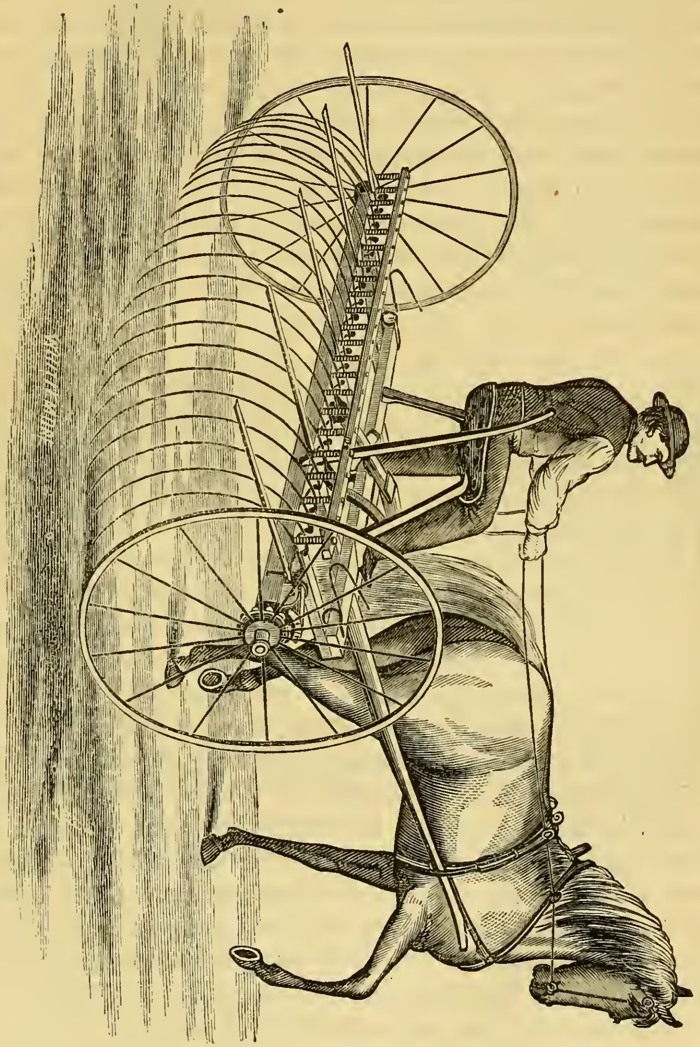
SELF-LOCKING RAKE.

This is a simple and effective machine that may be worked either by the foot or the hand. A lock-lever is arranged to hold the teeth to the ground in the raking of heavy grass, where many machines are inclined to rise and scatter the hay. It has an easy spring seat secured to the axle, so that the weight of the driver does not press upon the horse. By means of the self-locking arrangement it can be set with the teeth a little above the surface of the ground, when it becomes a very efficient gleaner in grain stubbles. The teeth act independently, and it is furnished with cleaners which secure the instant unloading of the rake when lifted. It is manufactured by Messrs. Whittemore, Belcher & Co., at Chicopee Falls, and is for sale at their warehouse, 34 Merchants' Row, Boston.

No farmer can afford to be without a good horse-rake. It saves time and labor at the busiest season of the year, and often when without its use it would be impossible to avoid injury from exposure to bad weather. It is almost as essential on the farm as the plough itself.

The Bay State Rake also appeared at the exhibitions last year in its perfected form. This rake had been known for a year or two previously as the Barre rake, having been invented by S. R. Nye of that town; but from a slight defect in mechanical construction it had not fully justified the expectations which were at first entertained of it. This objection having been entirely overcome, it entered the hay-fields last year and won the most enthusiastic encomiums from those who are most capable of judging of its practical value and working capacity.

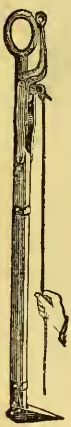
This rake is mounted on high wheels. It is a steel tooth, each tooth being hinged to the axle and pressed down by spiral springs. Each tooth operates independently of the others in passing an obstruction, while the draught is light and the material and workmanship are unsurpassed. The ease with which it is worked is something wonderful. The driver has only to touch a spiral spring with his foot, with a slight pressure, which any boy can apply, when the rake is lifted by the horse, and by means of cleaning rods frees itself at once of its load. It is set so high that a large windrow can be gathered, and if desired the windrow can be cocked ready for loading. This rake is manufactured by the Buckeye Mowing Machine Company, at West Fitchburg.

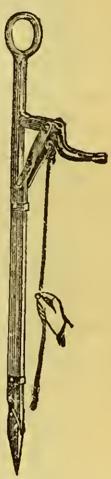


THE BAY STATE RAKE.

Improvements have not been confined to the mowing, spreading and raking of hay. They have extended to the means of loading and unloading, and have effected an immense saving of physical strength and of time. Of the patents for loading hay I have not had an opportunity of seeing those which have met with the greatest success, and am not able to speak from observation.

Of the horse pitchforks for unloading and mowing away hay, several have been introduced into this State, and have been worked with more or less satisfaction. They have also been exhibited at the fairs, where they have been examined by large numbers of observing, practical farmers. One of the cheapest, most compact and simplest contrivances that I have seen is Walker's patent.

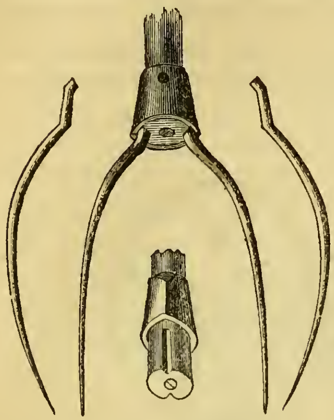




This is a novelty in the way of invention. Walker was the inventor of the original harpoon fork which he introduced and worked with success; but he became satisfied that he could improve upon it, and now has brought out what is known as Walker's Improved Horse Pitchfork, as shown in the annexed cuts.

This fork is made entirely of iron, so that it is durable and light, the weight not exceeding ten pounds. Its simplicity of construction would seem to avoid the liability to get out of order. It has no tines to catch and no braces to break, while it is easily operated. Its strength and grappling power are sufficient to take up as much hay as the horse can raise over the beams. It may be worked rapidly. When thrust into the hay it is a straight, spear-like implement, till, on pulling a spring or bolt in the handle, a prong or hook is thrust out to grapple the hay, and thus lift large quantities from the load. This fork is manufactured by Messrs. Wheeler, Melick & Co., of Albany, N. Y.

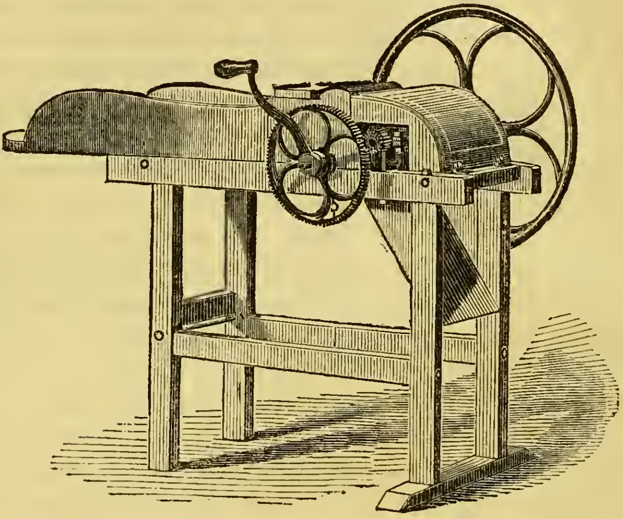
A new invention has been applied to the hand-fork, by which the tines, in case of breakage, are easily removed and replaced by others. It is known as the Montgomery fork, manufactured by the Montgomery Fork Company, at 254 Pearl Street, New York City. The mode of securing the tines will be readily seen by the annexed cut. A ferrule is held by a screw clasping tightly around the end in which the tines are inserted. On loosening the screw and knocking back the ferrule the tines can be put in without difficulty, when the ferrule is driven back to its place and screwed fast. It is well known that in attempting to repair a broken tine the other is usually spoilt, so that practically on the occurrence of an accident of this kind the whole fork is thrown aside as worthless. With this fork any number of extra tines can be had at a low cost, to be used when needed ; or should the handle break, the tines can be fitted to another handle in a few minutes' time, and the fork is as good as ever. The handle is not tapered at the end where the tines are inserted, so that the whole strength of the wood is left. The tines are of steel, uniformly tempered. The weight is no greater than that of the common fork. The manure forks, with both long and short handles, are especially neat and strong, and there can be no danger of the tines working loose in either hay or manure forks. This appears to be a very useful improvement.



THE MONTGOMERY FORK.

Hay and fodder cutters have become quite indispensable in the barn and the stable. Much as the question of the economy of cutting or chopping food for stock has been discussed, few farmers would be willing to be without a strong and good machine ; because, whatever may be the individual opinion as to the matter of cutting hay and some other kinds of food, there are many coarser substances, like straw, corn stover, swale hay, &c., about the cutting of which there can be no question of economy. If they would be utilized at all, it is often almost a matter of necessity to cut them in order to feed them out with the greatest economy and advantage, especially when the greater facility of handling the manure is taken into account.

One of the best hay-cutters with which I am practically familiar is known as the National. This machine is made of several sizes, to meet the wants of large and small farms. The smaller ones are worked by hand, and the largest may be driven by horse or steam power. This machine runs easily and cuts uniformly. This is a very important feature in a hay or straw-cutter. It is not liable to clog, and it possesses other advantages which give it a decided superiority over many other machines that I have examined.

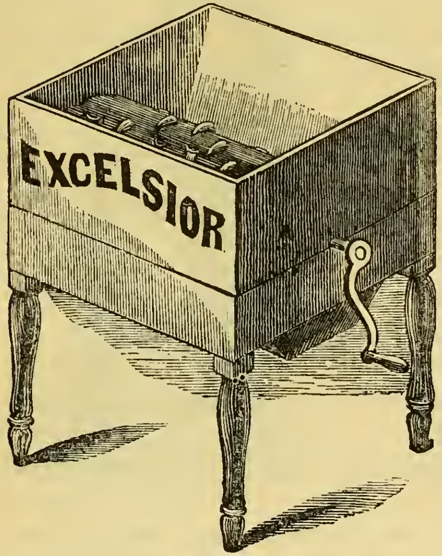


NATIONAL FODDER-CUTTER.

It is manufactured by J. D. Burdick & Co., of New Haven, Conn. Joseph Breck & Co., at 51 North Market Street, are the Boston agents.

A good root-cutter is another essential labor-saving implement. No good farmer would think of keeping a flock of sheep or a stock of cattle without a liberal supply of roots. The turnip, swede and mangold crops are almost as important, in point of economy of farm management, as the hay crop itself; and it will be found very difficult to keep up and improve the fertility of a farm without them. More than seventy-three tons of mangolds to the acre have been raised in this State, and crops of fifty to sixty tons are not uncommon. If there is any other crop which is of equal value that can be raised with as little labor, I do not know what it is, especially when it is used as a change in the spring of the year, and when it is considered that store pigs can be kept well on raw mangolds alone from November to March. The amount of manure which the root crop is capable, under judicious management, of returning to the soil, is quite remarkable.

But every farmer who has fed fruit or vegetables of any kind to stock, understands the importance of reducing them to small pieces before feeding them to animals, except, perhaps, horses, or such as have front teeth in both jaws, by means of which they can nip and reduce their food. Cattle and sheep, in eating pumpkins, carrots, turnips, potatoes, &c., must receive them of a size which they can readily take between the double teeth, or else they are liable to choke. Besides, many an animal's teeth are poor, and it is a great exertion in such cases to break down coarse roots into small pieces.



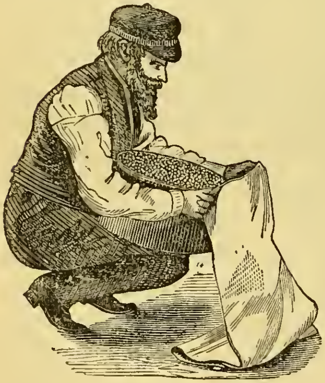
EXCELSIOR ROOT-CUTTER.

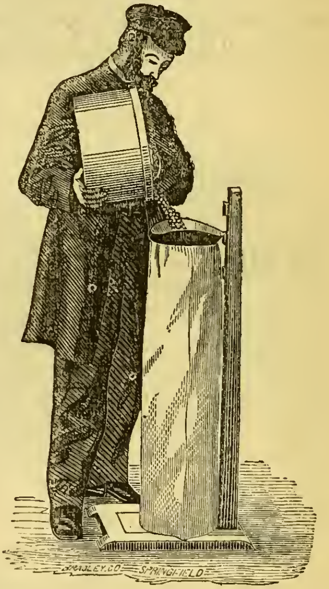
The Excelsior Root-Cutter, exhibited at the fair of the Housatonic Agricultural Society, appears to me to be one of the best that I have examined, on account of the shape and condition in which it leaves the roots after they have passed through it; that is, in long and slender strips of the size and shape of a man's thumb. This machine cuts pumpkins, turnips and other kinds of roots of a size desired by the operator. At the last State fair at Buffalo it cut a bushel of potatoes fine enough for sheep in twenty-six seconds. The roots are put into a box and come in contact with a hollow iron cylinder, the upper side of which is shown in the figure. Small gouge-shaped cutters are fastened to the surface of this cylinder, and these slice out the pieces of roots and pass them down into a basket below with great rapidity. It is so easily worked that a small lad can cut a bushel of roots in a minute with little exertion. If the knives become dull they can readily be sharpened by the use of a round file.

This excellent machine is made by J. R. Robertson, at Syracuse, N. Y.

A convenient and simple bag-holder has been devised and patented by E. C. Fairchild, of Sunderland, in this State. It consists of a metallic tunnel to which is attached four hooks which hold the mouth of the bag distended in a way to be ready to receive the grain from the measure or shovel without the inconvenience of holding and filling the bag at the same time.

The tunnel is attached to the standard by means of an iron plate, on which are placed three or four lugs, one above the other, so as to hold the tunnel at the desired height. It is a compact and durable arrangement, which must be very convenient on the farm, where there is much grain to handle. Its cheapness and simplicity will recommend it.





The above are only a few of the more recent inventions which have attracted my attention at the exhibitions of different societies. The list might be considerably extended did space permit, but it is sufficient to show that thought and skill and mechanical ingenuity are constantly at work to develop the means of lightening labor and saving time.

The wants of Western Europe, especially of Great Britain, and the resources of the New World, have opened up a vast field for enterprise and investigation in relation to the preservation and transportation of animal food. For more than a century various processes have been devised, introduced and often patented, and it may not be unimportant to state generally the principles which have been involved in the successful plans hitherto suggested.

Drying meat in the sun, or artificially, forms the groundwork of the simplest methods. The charqui or jerked beef of South America and the lumps of beef preserved by savages, constitute excellent examples. Travellers have often been amazed at the absence of putrefaction and at the tendency to natural preservation of the carcases of animals met with on many plains in the South. Heat, with rapid currents of dry air not far from the Atlantic coast, seems to furnish the conditions of this spontaneous process which has been modified in the hope of meeting the wants of mankind in the manufacture of charqui. But from time immemorial have the people in Scotland skinned and cut up the carcases of sheep which had died of braxy, and having squeezed much moisture out of the flesh, have smoke dried the hams, once so eagerly sought after in the London market. The fact that braxy hams were the produce of diseased animals put an end to the trade when rapid communication with the British metropolis was first established.

Salting meats came into great request with the development of the European navies. The trade in salt provisions of all kinds is only limited by supply, but it is evident to all that much of the meat-juice is wasted. Simple salting is almost impossible in hot countries, and the production of scurvy from the use of such food must lead to the introduction of other processes of preservation. By Dr. Morgan's process of injecting the salt into the blood-vessels of animals, it was hoped some of the inconvenience arising from the ordinary curing process might be overcome; but it has not realized the expectations of commercial men. Antiseptic salts, such as the hyposulphites of soda and bisulphite of lime, have been recommended to a limited extent.

Various plans have been successfully adopted for the preservation of spiced and cooked meats. The Spaniards long since packed sausages in cases layer by layer, intercepted with fat poured on warm so as to fill up every interstice and completely surround the mass. If I mistake not, adventurous explorers in Australia have adopted a similar plan with meat which they required on distant overland journeys; but it is necessary that the meat should be cooked. The most recent and beautiful modification of this process is that of Dr. Redwood, of London. Paraffine, that simple, neutral and delicate material, capable of resisting all ordinary temperatures, is used for a coating around meat which has been cut up into parcels of a few pounds, and has been raised to a temperature of 240° Fahrenheit. The paraffine is easily melted off when the meat has to be used, and it imparts no flavor to food, which can be dressed in various ways as a palatable form of diet.

The system of filling tin cans with animal and vegetable substances, heating the whole first up to the boiling point, and then to a higher point whilst the lid is finally closed by a drop of solder poured on a pin-point outlet left for the escape of steam and to prevent the bursting of the vessels, is one of the most successful ever introduced. In order to raise the temperature of the baths into which the tins are placed to be cooked, a solution of chloride of potassium or chloride of calcium is used instead of water. This does away with much of the steam which otherwise fills the atmosphere of the manufactories. The tin cans are usually placed in testing rooms at 90°, and if they resist this temperature for three or four days, will keep for twenty or thirty years.

In Liebig's process the animal is slaughtered and dressed in the ordinary way, and when the carcase is cold the meat alone is placed in iron rollers, armed with points, whereby it is reduced to a pulp. This is thrown into water, steamed for an hour, and passed into a trough with a sieve at the bottom through which the meat-juice oozes into another vat. The fat is skimmed off. Steam-pipes serve to heat the pure gravy, and bellows are made to blow on the surface so as to evaporate for six or eight hours, when it is passed into a filtering vat and drawn off as extract of meat. This is then packed in tins for exportation. Eight small tins holding the juice of an entire ox, are valued at ninety-six shillings, and make over one thousand basins of strong soup, estimated to cost one penny per basin. This soup is probably more stimulating than actually nutritious, as much of the material in meat which renders this a sufficient food for the support of man is left behind in obtaining Liebig's extract. It is, however, an invaluable addition to our alimentary substances.

But heat, which has even in other ways been brought to the aid of the meat-preserver, has not alone attracted general attention. The mammoth's flesh in the regions of eternal snow, and the frozen animals in the caves of the highest mountains in almost every part of the habitable globe, have suggested to man the freezing system which we use for our turkeys and prairie chickens, which is employed to preserve salmon and other fish, and affords fresh meat to passengers across the Atlantic, has induced the construction of ice-houses which can be brought to as low a temperature as 24° Fahrenheit, and suggested the establishment of refrigerator railway cars, whereby we in Boston are to be furnished with the healthy beef of the West. But frozen meat loses its best flavor, and putrefies almost instantly on exposure to air.

The use of antiseptic and other gases for the preservation of food in hermetically sealed vessels is of recent date, and hitherto has only served, and that to a very limited extent, for the preservation of fruit. Meat has been preserved, but not so successfully as to lead to the development of a trade.

Another invention of a different character has recently been brought to the attention of the people, and it promises to be of immense importance in modifying our supplies of animal food. It is that of a new process of preserving meat by the use of carbonic oxide and sulphurous acid gas. This simple and inexpensive process was devised by Professor John Gamgee, of the Albert Veterinary College, London. It is to be applied first, on a commercial scale, in this country.

It is easy to see that should it prove to be practicable, on a large scale, as there seems no reason to doubt, it will do away with the cruel system of live stock transportation over long lines of railway, which is in the highest degree objectionable for many reasons. The animals arrive at the market for sale, after five or six days of travel, during which they are closely crowded into box cars, often so that they cannot touch the fore feet to the bottom of the car for hours in succession; without a drop of water or a mouthful of food during that time, and compelled to breathe constantly a pestiferous air.

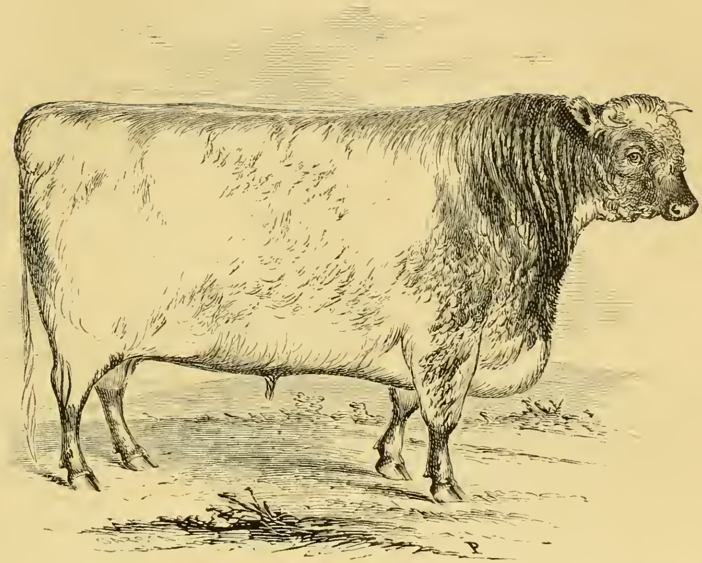
They arrive here, of course, in a highly feverish condition. Their flesh is diseased, so much so that if there were an attempt to keep them a few weeks and restore them to a normal condition of health, a very large per cent. would die, and the balance would inevitably fall off in flesh.

By Gamgee's method of preservation, the carbonic oxide is administered very much in the manner of giving ether, the animal suffers but slightly, if at all, and the flesh is preserved fresh and sound for months, with less cost than the ordinary mode of salting. The oxygen being entirely removed from the body of the animal and displaced by the carbonic oxide, all parasites, trichinæ, &c., are probably destroyed, and the flesh of swine rendered as harmless as possible. This process of preservation will avoid the necessity of the use of salted meats, and enable both the city and the country consumer to have a supply of fresh and healthful meats at a less cost than heretofore, while whole carcases can in a very short time be preserved at or near the place where the animal is raised—at the West, in Texas or South America—and sent to a distant market at small expense.

This invention promises, therefore, to have an important bearing upon the supplies of healthful animal food throughout the world.

CHARLES L. FLINT,
Secretary of the State Board of Agriculture.

Boston, January 22, 1868.



"6TH DUKE OF THORNDALE." Bred by Mr. SAMUEL THORNE, Washington Hollow, N. Y., the property of G. T. PLUNKETT, Hinsdale, Mass.

Got by 3d Duke of Thorndale, (exported,)	(17749)
Dam 4th Duchess of Thorndale by 2d Grand Duke,	(12961)
" Duchess (—) by Duke of Gloster,	(11382)
" Duchess 66th by 4th Duke of Northumberland,	(3649)
" Duchess 38th by Norfolk,	(2377)
" Duchess 33d by Belvidere,	(1706)
" Duchess 19th by 2d Hubback,	(1423)
" Duchess 12th by the Earl,	(646)
" Duchess 4th by Ketton 2d,	(710)
" Duchess 1st by Comet,	(155)
—— by Favorite,	(252)
—— by Daisy Bull,	(186)
—— by Hubback, (319,) dam by J. Brown's Red Bull,	(97)

APPENDIX.

REPORTS OF DELEGATES

APPOINTED TO VISIT THE

AGRICULTURAL EXHIBITIONS.

ESSEX.

According to appointment, I visited the forty-seventh annual exhibition of the Essex County Agricultural Society, held at Haverhill, September 24 and 25. The society, one of the oldest and most flourishing in the State, and the only one in Essex County, has no local grounds for its exhibitions, but itinerates about the county from year to year, no doubt to the advantage of the society in many respects, and to the disadvantage, in others.

The show of cattle, though good, was not quite up to what I expected to see, and hardly did the society credit, as I think. There were a few good oxen on exhibition. A very good herd of eighteen cows, by William B. Carleton, of Haverhill, and other single entries worthy of mention. There was a good number of excellent young horses and colts on exhibition, showing good judgment and care in breeding and rearing.

The show of agricultural implements was quite large, induced, no doubt, by a special premium of $25 offered by the president of the society. There was, also, a very interesting trial of twelve or fifteen ploughs on the first day of the fair, in which the people manifested a strong desire to find out which was the best plough.

The ploughing match that came off on the second day, was a grand affair,—by far the best thing of the kind it was ever my good fortune to witness. There were above twenty teams entered, among which were six or seven entered by boys under nineteen years of age, who competed for special premiums offered by the president of the society.

Notwithstanding the field of operations was a mile or more from the village, there was a large number of spectators on the ground, and a good degree of interest and even enthusiasm manifested on the part of all concerned. The boys did exceedingly well, and were amply rewarded for their efforts, not only by the liberal premiums awarded, but by the golden opinions won from a large crowd of spectators.

But it was at the town hall that the interest and efforts of the members of the society seemed to culminate.

The exhibition of a large number of most excellent specimens of apples, pears, peaches, and especially of grapes, showed that the people of Essex County had given a commendable degree of attention to the cultivation of fruit.

The vegetable department was mostly supplied by Samuel A. Merrill, of Danvers, and Richard Webster, of Haverhill, who did themselves great credit by their exhibitions.

The bread and butter departments were by no means neglected, and every available space about the hall seemed to be filled with articles of domestic manufacturing and the fine arts.

The floral exhibition was a magnificent affair, and needed to be seen and studied to be appreciated.

Too great credit cannot be given J. F. West, of Haverhill, for the interest and good taste manifested on his part in this unusual display of flowers. Large crowds were in attendance at the hall both during the days and evenings of the exhibition. About noon of the second day, a procession was formed in front of the town hall, and escorted to the North Church, where the people were delighted with music by the choir, and instructed by an able and very practical address by the Rev. R. H. Seeley, D. D., of Haverhill, on the subject, "What shall we do with our Farms?"

At the close of the interesting exercises at the church the crowds of people were conducted to another feast of fat things prepared at Music Hall. Here the physical man was not only regaled with the best the earth affords, but excellent speeches by Governor Bullock, General Banks and others, did all for the intellectual man that could be desired on the occasion.

One excellent feature of the exhibition I would not pass in silence, viz.: the promptness with which the programme was carried out. For instance, the ploughing match was put down to come off at ten o'clock, and though there were from twenty to twenty-five teams entered to plough, in less than five minutes from the time the clock struck the hour, the word "go!" was given, and every team was at its work.

In closing this Report, I would not fail to express my obligations to the president and secretary of the society, for the gentlemanly manner in which they entertained me during my stay at Haverhill.

H. S. Ward.

MIDDLESEX.

As your delegate I attended the seventy-third exhibition of the Middlesex Agricultural Society's cattle show and fair, held at Concord, on the third and fourth of October last. Having visited them on a similar mission at their sixty-ninth exhibition, it enabled me to judge of the improvements in the past four years. I now found them located near the railroad depot on a fine tract of land of sufficient extent to enable them to erect every convenience for all departments in a permanent manner, of which at present they have only the stables for valuable horses, and hay lofts. The hay fed out by the society on the two days amounted to about $100. The cattle were in covered pens, seeming as well contented as they would be at their own homes. It is contemplated to erect a large shed or sheds with stanchions in which the neat stock can be secured for the better view by committees and visitors. Their half-mile track is as well laid out and graded as any in the State. They have no hall as yet, but after the dinner was partaken of by a large and intelligent company, their president, Addison Gage, Esq., called the attention of members to a plan of a new hall that they proposed to build, which call was responded to with such interest as I never before witnessed. Over $5,000 were subscribed by gentlemen who had means, and a desire to continue this old and useful society; and they were men without the horse-jockey in them. Was not the meeting of such men by the farmers a great benefit? Does it not engender a feeling of pleasure to know that their occupation is one that can be made the most pleasant and independent if they will but strive to invest all their energies and capital in their business, the same that others do in theirs? And I will say that they had invested, when such teams of oxen and horses as were there, either for trials of strength on the cart or plough, and in both departments there was a feeling to win if a fair opportunity was offered, and so far as I could judge, they had that opportunity, and performed their parts in such good time and manner that I felt relieved to know that it would not be my duty to decide who should have the first premiums. I would suggest to competitors the advantage of preparing themselves and teams with such ploughs as they intend to compete with before coming out to the trials. When they know that their ploughs are set just to the desired width and depth, and the team all trained to start with an assurance of success, such preparation will greatly conduce towards establishing such order in all the operations on the farm.

In the large tent were exhibited as large a collection of fruits, flowers and vegetables as I ever saw at a county show.

In the pens were collected many of the finest animals of the best breeds of neat cattle, swine and breeding mares.

On the track were exhibited some if not the best trotting and family horses in the country; and while thousands were crowded together to witness some feat or other that most interested them, I was unable to detect the least intoxication by liquor or anger. Can it be said with as much truth that a like crowd can be gathered in the city without a broken head, if not bloodshed?

In conclusion allow me to say that, when I left, on the eve of the second day, it was with a feeling of pleasure that I could report that this old and honorable society was becoming rejuvenated in a manner that will repay the State for its bounty in a hundred fold.

I here tender my thanks to the officers and members who contributed so largely to the comfort of your delegate.

James Thompson.

MIDDLESEX NORTH.

The annual exhibition of the Middlesex North Agricultural Society was held at Lowell, September 26th and 27th.

It will not be necessary for me to say anything about the fine grounds and commodious halls of this society, as they have doubtless been described by previous delegates.

In the hall the display of pears was very fine, most of the desirable varieties being represented. There was also a very good show of grapes. Of apples, I found the same report as in most other localities of the State visited the past season,—a small crop and indifferent quality.

The ladies had lent their usual aid in giving interest and variety to the collection of beautiful articles on exhibition.

The show of vegetables was not large, but very good. An ambitious dentist of Lowell, not to be outdone by any farmer, displayed, as trophies of his prowess, a half-bushel measure filled with human teeth, drawn with many a sigh from the aching jaws of suffering humanity.

There was a very creditable show of milch cows, but of other cattle not as good as I hoped to have seen. It appeared to me as singular, that premiums should be offered for cows of the different improved breeds, and none for thoroughbred bulls. If there were any on the ground, they escaped my notice. I was sorry to see a number of grade bulls.

I trust the time is not far distant when our agricultural societies will cease to offer premiums for animals that can give no promise of improvement to their progeny.

The show of poultry was not large, but very good. Swine were represented by a few specimens. Sheep, I am sorry to say, there were none to speak of.

The dinner, which is a very pleasant feature of the exhibitions of this society, was nearly over when I reached the hall, and I found a gentleman,—one of the representatives of the people of Massachusetts in the Congress of the United States,—entertaining the company with a speech in which he took occasion to say that he had always opposed the establishment of an agricultural college, and gave it as his opinion that it would surely fail. That it could succeed he pronounced inconsistent with the nature of things. Just what things, the gentleman did not tell us; but suppose it must have been the ungenerous things he had said against it. He thought it useless, also, to teach anything of agriculture in our common schools. The farmer must get his special education on the land only. He represented the occupation of the farmer as hard, coarse and repulsive, and thought as soon as our young men were educated enough to fit them for any other business, they would leave it on the first opportunity. Hence the inference was, to keep men on the farms they must be kept in ignorance. Therefore, he would have no colleges for farmers. He would organize a corps of learned professors, who should perambulate the State during the summer season, and observe the efforts of the untaught farmers to dig their education from the ground, and in the winter give lectures on the soil and its wants, and, like Dr. Hornbook, "just its disease and what would mend it, at once they'd tell." But just how and where he expected to find and educate those wonderful professors the gentleman did not inform us. In the days when prophets were held in higher esteem than now, there were false prophets,—prophets of Baal,—whose predictions came to naught. Such, I trust, will be the fate of the doleful foreboding of the gentleman alluded to.

I did not remain to witness the exhibition of horses which took place the following day, but am informed that there were many fine animals on the ground.

William Birnie.

MIDDLESEX SOUTH.

The annual exhibition of the Middlesex South Agricultural Society was held at Framingham, on the 17th and 18th of September, according to assignment. Your delegate was unable to attend until the second day. The exhibition was an exceedingly interesting one. The collection of animals on the ground was large; and it presented a variety, which is rarely seen in one locality, in such perfection. It is not easy to see how the same pastures and fields can feed, profitably, the Shorthorn, the Ayrshire, and the Alderney, alike; but there they were on exhibition. And they presented themselves in a manner which might well attract the attention of the most critical observer. The well-known herd of Shorthorns in the town of Framingham, was present, and indicated good care and attention during the past season. The animals repaid well the most careful inspection.

The two herds of Alderneys, which appeared in rivalry, were extremely attractive. It is seldom that so many rare and valuable animals of this breed are brought together. While both were good, the difference between them was striking. One of these herds, which has long been bred in this country, seemed to have reached a degree of size, strength and thrift, quite remarkable. Whether it is the result of climate, breeding, or feeding, it might be difficult to tell. But their solid proportions, strong bones, and vigorous muscle, all showed that they had enjoyed some unusual advantages since their ancestors left their native island. And yet one could not fail to perceive the admirable structure of the competing herd of more recent importation. While a peculiar delicacy was very observable, it was evident that some of these animals had been developed to the best standard of a dairy cow of this description. In the quality of their bone, shape of quarters, width of hip, firmness of shoulder, and depth of carcase, they are almost unrivalled. And it does seem to your delegate, that with a judicious selection of strong and vigorous males, this herd might be developed into one of the best known.

The exhibition of horses indicated care in the selection, and judgment in the breeding of this class of animals. Any departure from coarse-headed, thick-shouldered, large boned, heavy gaited horses, is agreeable; and the development of style and quality in connection with speed is always desirable.

A great deal might be said in favor of the swine on the grounds. The combination of the length and weight of the coarse breeds, with the thrift and rapid growth of the finer, has been brought to a high degree of perfection by the members of this society. And if there is such a thing as a hog that can be raised and fattened profitably in Massachusetts, it might have been found in their pens.

Without enlarging upon the exhibition of fruit and vegetables in the hall, which is always creditable with this society, your delegate cannot but express his satisfaction with the many indications which he found, of care and attention to the accurate business of agriculture. Systematic devotion to special objects, the only profitable scheme of farming known in this State, was manifest everywhere. And in careful breeding and careful cultivation, there was abundant opportunity for the student to apply accurate and useful observation.

The address on the occasion was delivered by Judge French. It was an account of the flowing of the Sudbury meadows; and was listened to with that attention which might be expected from those who have a personal interest in this long and difficult controversy between the farmers and manufacturers of this section of the Commonwealth. This address was delivered at the dinner-table—a plan which may have its advantages—but it undoubtedly has its disadvantages. It is evident that no address, whether upon agriculture, education, politics or religion, can be equally adapted to a church, a hall, an out-door audience, and a dinner-table. An address is one thing—an after-dinner speech another and quite different thing. And a speech worthy of being called an agricultural address, containing instruction and an appeal to the intelligence and activity of farmers, should not form a part of a festivity or a mere social entertainment. The old-fashioned mode of delivering these addresses in the village church had great advantages; so has the modern one of delivering them in an appropriate hall. But no man can tell the trial of instructing an audience in rivalry with trotting horses or a tempting dessert until he has tried it.

Your delegate cannot speak too well of the activity and energy displayed by the Middlesex South Agricultural Society.

Geo. B. Loring.

WORCESTER NORTH.

The fifteenth annual fair of the Worcester North Agricultural Society was held on the 24th and 25th of September. Both days were pleasant, the attendance large, and an enthusiasm manifest, which augured well for the future of this society. If the exhibition of stock, fruit, vegetables, farming implements and domestic manufactures, and especially of men, is as good throughout the State as at Fitchburg, our agricultural societies are not failures, and their epitaph need not be written for some years yet. The attendance the first day was estimated at some five thousand, and the second day at eight thousand. The very presence of so many stalwart and intelligent yeomen, with their wives and daughters, all in their holiday attire, behaving decorously, and exhibiting intelligence, manliness and self-respect, in their countenances, words and actions, is one of the most pleasing features of these agricultural exhibitions. At Fitchburg, we are most happy to say, everything was done decently and in order. Though the crowd was large, we noticed no boorish conduct, nor a single person under the influence of intoxicating liquors. As we have passed through Worcester County occasionally from our childhood, we have been led, from the appearance of the lands, barns and houses, to put a high estimate upon the farms of the county, and the conclusion was that the farms were an index of the farmers. Our conclusion was verified on seeing them together at Fitchburg, and our faith was lost in sight.

This was the first exhibition of the society on its own grounds, and the attendance larger and more enthusiastic on this account. These grounds comprise twenty-five acres, pleasantly located, well watered, beautified with groves on the north and south, and surrounded by a substantial board fence. At present, the president, secretary and exhibitors have to dwell, like Abraham, in tents, but we doubt not the enterprise of the society will soon lead to the erection of suitable structures for the accommodation of man and beast. This struck us as the great want of the Worcester North Society. Tents may have been well enough for the patriarchs, with their nomadic habits and mild climate, but New England is on a higher plane, both literally and figuratively, than Canaan, and ceiled houses for men and warm shelter for stock are what our latitude and civilization demand, and on our next visit to Fitchburg we expect to see this demand satisfied.

The ploughing match occurred on the morning of the first day, and we noticed a division of the teams into oxen and steers, the former competing separately from the latter, a division which we recommend for adoption by other societies.

The exhibition of neat stock, sheep, swine and poultry lasted only through the first day, and was large and every way creditable to the enterprise of the farmers of North Worcester. We respectfully suggest to the managers that the exhibition of this kind of stock should continue through both days. Every well formed, thoroughbred animal is an educator, and should give lessons for more than one day, especially as the number of scholars present is generally larger the second day than the first. The original name of these exhibitions was "cattle shows," but a visitor on the second day may well ask, "Where are the cattle?" The exhibition on the second day has, in too many of our societies, degenerated—perhaps some would say has been elevated—into a horse show, and an agricultural horse trot has come to be the leading feature of the exhibitions. We do not object to the culture and exhibition of that noblest of animals, the horse, but if our fair grounds should degenerate into mere race courses, and jockeys are the leading characters on these grounds, the farmers will be sure to retire in disgust. We are happy to say that at Fitchburg the horse did not cast all other animals into the shade. There were fine specimens of Shorthorns, Ayrshires and Alderneys, as well as mixed and native breeds. We were particularly gratified to notice some full-blooded stock intended for exhibition and not for a premium. Messrs. Whitman and Adams of Fitchburg and Gates of Leominster set the noble example of contributing valuable animals for the benefit of the public, without expectation of other reward than the consciousness of doing a noble deed;—by the way, a higher reward than green-backs, silver spoons or golden goblets can possibly furnish. We were glad also to notice that the committees on premiums were not restricted to giving only one premium to one person, and compelled, as in some of our societies, to pronounce a crop, animal or article a second best which really should stand in a much lower grade. We are aware that the argument for the scattering of the premiums is, that it enlists more competitors, but it does not seem to us that this reason of policy should outbalance the weightier one of truth and justice. If one person merits all the premiums in one division, justice demands that he should have them all. At Fitchburg we noticed Mr. A. Whitman carried off all the premiums for Shorthorns, Mr. E. T. Miles all for Ayrshires, and Mr. John Brooks all, with one exception, for Alderneys.

After due respects had been paid to the stock, the officers and members of the society, with their ladies and invited guests, sat down in patriarchal style to a bountiful repast, to which ample justice was done. The feast of reason and flow of soul followed in due succession, introduced by a neat and spirited speech by the president, Joshua T. Everett, Esq., of Princeton. These social dinners should constitute an element at all our agricultural fairs. A good dinner is highly conducive to good feeling, and the cultivation of our social natures, with charity and all its train of graces, is carrying out the design of Him who made us social beings, and whose mission on earth was to bring peace and good will to men. The great want of the farmer's life is intercourse with his fellow-men. The farmer's wife especially leads an isolated life, and these fairs should be made of such a social nature that they will tend to furnish food for mental growth and for the development of charity, good manners and all the amenities of life. We rejoice to say that at the dinner table at Fitchburg the ladies seemed to be in the majority, as they almost always are in every good cause. The interest manifested by the ladies at Fitchburg is worthy of praise and ought to be emulated in other places. We desire to express our personal obligations to the efficient wife of the efficient secretary, Mr. Lewis H. Bradford, not only for kind hospitality, but for driving us around the village and into the surrounding country. We shall vote for women's rights, if men can always be so pleasantly driven.

We would suggest to the managers of the Worcester North that an addition might be made to the interest and profit of their fair, if a meeting could be held in the evening for social intercourse and agricultural discussion. This has been tried in other societies with success, and we trust increasing attention will be given to it throughout the State. Thoughts should be sown broadcast at our fairs, and they will return some thirty, some sixty and some an hundred fold. An ox may be estimated by his girth and weight, but mind is the standard of the man, and the development of man, and not his mere amusement, must be the object aimed at by our agricultural societies, if we would avoid the criticisms of the "Springfield Republican" and the just condemnation of the public.

On the last and great day of the fair at Fitchburg, came the horse, a greater crowd, the address by George E. Towne, Esq., (which was a business man's view of the farmer's occupation, replete with practical suggestions for a thorough and systematic management of it,) the dinner, with its after speeches, and the final adjournment, leaving a replenished treasury and many pleasant remembrances.

Our thanks are due for kind attentions and hospitality shown by the president and secretary, also by Messrs. Billings, Adams and many others.

Alexander Hyde.

WORCESTER SOUTH-EAST.

Your delegate, appointed to attend the exhibition of the Worcester South-East Society, held at Milford, reports as follows:—

On my arrival in the morning of the first day, I found the ploughing, which was done with oxen, had already commenced, and not understanding the locality, did not witness that part of the exhibition, but heard it well spoken of.

The park which the society occupies is a fine one, and the hall good and substantial,—the grounds belonging to private individuals, the buildings to the society.

The show at first appeared somewhat thin, but before eleven o'clock the stock apartments were more than full. Their heavy oxen were not up to the standard, which might have been expected, judging from the display of steers and young oxen. Several herds, consisting of cows, heifers and calves, were on exhibition, which would do credit to any society. Some very choice specimens of the Jerseys, as good as I have ever seen. Of their working oxen I cannot speak too highly. I think I never saw so good training. It was truly surprising to see what command the driver had over his oxen,—not by the use of the whip, but by the *still small voice* that seemed to inspire his team with life and action. One incident was particularly noticeable. After trying twice to back the load up the hill, and having almost succeeded, one man withdrew from the conflict, saying that he would rather lose the prize than whip his team. Would that we had more such men to train and drive our oxen.

The show of swine was very fair. A few very nice animals.

There was only one lot of sheep on the grounds.

There was a fine show of breeding mares and colts, some of which were held at fabulous prices, and most of them from noted stock. Judging from the young stock of horses *on exhibition*, as well as from some old ones, we should think that in the future there would be no lack of good horses within the limits of this society. Some very fine pairs of matched horses were shown, as well as a large number of good single driving horses. These all made a good display on the track.

As usual, the programme ended with a *horse trot*, which went off, we think, to the satisfaction of the crowd.

The display in the hall was very good, but not as full in some departments as it might have been. There were some very nice specimens of apples, good for any year, but particularly so for this. Some excellent winter squashes, that looked good enough to eat. The ladies exhibited some very fine specimens of domestic and fancy articles, which showed no lack of interest on their part.

On the whole we consider the fair a success, and one which does credit to the society.

The address, by Judge Russell, was one calculated to instruct as well as interest, and was listened to with marked attention.

I will close this Report by acknowledging the courtesy of our friend, Mr. Knowlton, and the officers of the society.

H. S. Porter.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

As delegate from the State Board of Agriculture, I attended the forty-ninth annual exhibition of the Hampshire, Franklin and Hampden Society, which was held on their grounds at Northampton, October 3d and 4th. I had seen some, and heard much of the Durham stock raised in this section of the State, "but the half had not been told me." In conversation with the Hon. Paoli Lathrop, of South Hadley, an extensive breeder, and one of the pioneers in improving the Shorthorns or Durhams, he said he had been in the business of raising thoroughbred Durhams for quite a number of years; that the demand for the first class of animals was always greater than the supply, and at the present time the prospect for raising such stock is better than ever before. The Durham bull owned by M. J. Smith, Esq., president of the society, which took the first premium, was raised by Mr. Lathrop.

The Durham bull owned by Stephen Heyward, Jr., seventeen months old, took the second premium. This was one of the finest animals I ever saw. He was raised by George T. Plunkett, Esq., of Hinsdale, from his famous bull valued at $5,000. The question may be asked, why he is so valuable? Because he is said to be *best*, known here or in Europe. His stock is in demand for exportation. The tables are turned. Old England's Johnny Bulls now send to Hinsdale for their supply of bulls. Perhaps I should mention in this connection other fine animals,—the Ayrshires and Jerseys were there; but, in this locality, the Durhams predominate.

One herd of fifty-nine Kentucky Durham steers, fatted there and sent to Albany for beef, were purchased by N. Day and S. Alvord, for the purpose of completing them by stall-feeding them this winter.

I was told that many farmers go into this operation, not only for the growth and rise of the animals, but for the purpose of increasing their manure, which must be had to grow that "dirty weed, tobacco;" yet, I suppose, the most profitable crop to raise on their river "meadow lands."

A town team from Deerfield, sixteen yoke, averaging about 4,000 pounds, I should judge, were mostly grade Durhams. The milch cows were not so numerous, but there were some very fine animals, and great reports were made of their product of milk and butter; and one cow with one-half of her milk, in June made seven pounds of butter; this reminded me of a man I once knew who kept but one cow and sold about one-half of the milk to his poor neighbors; he would always milk in two pails—the first half to sell, the remainder for his wife to make butter.

The several herds, together with other young cattle, were all very good; and, on the whole, it was a real cattle show.

Sheep, swine and poultry were well represented.

The exhibition in the hall of agricultural implements, fruit, vegetables, bread, products of the dairy, domestic and other manufactured and fancy articles were in abundance, and was creditable to the exhibitors, but time and space will not allow me to particularize. And there is no necessity for it, for the whole thing was ably reported and published in the local newspapers at the time for the benefit of all concerned.

The address at the town hall in the evening, by the Hon. Daniel Needham, of Groton, Secretary of the New England Agricultural Society, was listened to by an intelligent audience. His subject—"The Necessity of Education to the Farmer."

The second day was devoted to the exhibition of horses, and, as usual, brought together the greater number of people. The trial of draught horses was good; there were some very good horses on the track, and, if we take the word of the owners or drivers, there were many such; "for my horse is, all things considered, the best."

The colts were present in large numbers, and went to show there was a strong desire for improvement in raising good horses; and, like raising cattle, it is only the good ones that pay best.

In the afternoon came off the trotting and running, which was very well done, as every one said, so it must be true.

And with the very efficient officers, committees, marshals, and the enlivening strains of music from the brass band, so at the close, the verdict of the crowd was, a *success.*

I cannot close without rendering my thanks to the officers of the society, and to Mr. Porter, member of the State board, for their attention, courtesy and hospitality.

Thomas Billings.

HAMPSHIRE.

As delegate to visit the Hampshire Agricultural Society, I submit the following Report:—

The eighteenth exhibition of this society was held on their fair grounds in Amherst, September 24 and 25, two most beautiful autumn days, and was pronounced the best ever held by the society.

We were led to expect much from this society, from a knowledge of the location,—the well cultivated farms and substantial farm buildings indicating thrift and energy,—and were not disappointed.

This society is one of eight in the State out of debt, and embracing as it does some of the best farming towns in the Commonwealth, a noble yeomanry, many scientific men, the State Agricultural College, it has, indeed, a bright and flattering prospect before it.

There were exhibited four strings, or in all 162 oxen, as town teams, and fully 100 head of other neat stock. There were many noble animals, mostly grades. I had hoped to see more thoroughbreds. The working oxen were not as large, on the average, as I expected to see. There are two reasons, probably, for this. One is, the fact that many farmers purchase their oxen more or less matured, instead of carefully breeding and growing them themselves. The other reason is, that more labor is required of them than by the hill farmers.

There was a large number of horses entered for premiums, making a very interesting part of the exhibition. A number of two and three-year-old colts were noble animals. More than one hundred and sixty dollars were awarded for horses, not including premiums for speed.

Sheep, swine and fowls seemed to occupy their due proportion of space and attention.

The display in the hall deserves as much notice as any part of the exhibition. Many of the manufactured articles seemed to be from the immediate vicinity. Among them, carpenters' tools, by William Kellogg, of Amherst; repeating shot-guns, by Roper Rifle Co., of Amherst; gold pens, by Haskins Brothers, of Shutesbury.

The specimens of rye, winter wheat and corn were particularly fine.

A table extending the entire length of the hall was filled with a great variety of products, by Sunderland people alone.

A few figures will give some idea of the display in the hall. More than 150 varieties of plants, in pots and tubs, by President Clark, of Amherst, and W. H. Lyman, of Leverett; 58 entries of honey, wines, jellies and pickles; 34 entries of bread. David S. Cowles, of Hadley, had the largest collection of fruits, comprising 46 varieties.

Professor John Bascom, of Williams College, delivered the annual address on the afternoon of the first day. Subject, "The Peculiar Education the Farmer requires." It was listened to with marked interest.

After dinner on the second day, the society was first addressed by the president, Austin Eastman, who also introduced Hon. William B. Washburn, of Greenfield. Mr. Washburn congratulated the society on the success of the exhibition; said it was better than he expected to see here, especially the display in the hall. He referred to the interest felt in the Agricultural College.

Dr. Nathan Durfee, of Fall River, one of the trustees of the Agricultural College, and a member of this Board, was loudly called. He remarked the striking contrast between the beautiful and fertile fields of Hampshire and the rock-bound coast and sandy barrens of Bristol County, stating also some facts, showing what careful culture, aided by science, has done in some instances in turning those barrens to fruitful fields.

Hon. Edward Dickinson, of Amherst, was then introduced by the president as father of the society,—the preliminary movements suggested by Mr. D., some eighteen years ago, having resulted in gaining a charter from the State. Mr. Dickinson traced, as results of this society, the growth and increase of important interests of the town.

Professor Stockbridge, of the Agricultural College, made interesting remarks in regard to practical agriculture.

President Clark was the last speaker, and called the attention of the audience to a large life-like painting of Marshall P. Wilder, then hanging upon the wall over the speakers' stand, which had recently been presented to the Agricultural College by a Boston gentleman. And as the audience seemed almost to be in the presence of the honored and venerable man, President Clark recounted some of the noble acts of Mr. Wilder, and some of the benefits resulting therefrom to the cause of agriculture in this State, in the United States, and in the world; and remarked how fitting it was that his should be the first portrait to be hung on the walls of the college.

C. SANDERSON.

HAMPDEN.

Having by assignment of the Board attended the annual exhibition of the Hampden Agricultural Society, holden at the Hampden Park in Springfield, on the first and second days of October, 1867, and knowing that to be a stock-breeding region to considerable extent, we had expected to see a large number of thoroughbred animals on the grounds. Our hopes in that respect were not fully realized. Yet it is fair to affirm that in point of quality the show was *good.*

The cattle, we judge, were not on the grounds more than from three to five hours, after which it was understood the track was to be cleared for another purpose.

After Josh Billings had attended the Agricultural Fair at Billingsville, where he observed several strings of onions, bunches of turnips and other vegetables, many yokes of oxen and sheep, none of which excited any sympathy, he said it was evident the people "hankered after a good Agricultural Hoss Trot." We cannot, judging from what we witnessed at Hampden Park and elsewhere, regard the people of Billingsville as singular in their passionate fondness for practical trotting.

In our view, the horse fanciers of Springfield and vicinity ought to have been satisfied with one whole day, or at least have given one whole day to other branches of the show.

So far as we observed, however, the trotting at Springfield on the occasion of our visit was fairly carried on, and our ears were *not* saluted with disgusting profanity, as had been the case at other places, and enough of it to sicken a well-bred dog. If we are to have trotting at our fairs it seems to us that it should be so conducted as not to be an eyesore to the better class of admirers of the noble horse.

No place in the State has better facilities for trotting than Hampden Park, there being a mile and half mile track. Seats, also, which will accommodate three thousand persons, recently covered with gravel roofing, which, we trust, will prove convenient and durable.

Here we leave the horses and return to the neat and other stock.

Among the notable animals on the grounds were nine Devon cows and heifers and two bulls, shown by William Mattoon of Springfield. Mr. Mattoon also showed a most beautiful yoke of Devon oxen.

William R. Sessions of South Wilbraham, had eleven Shorthorns and grades, among which was a pure bred bull, together with a herd of young Shorthorns and grades. They were nice animals.

H. M. Sessions had fifteen pure bred Devons, old and young, and all the progeny of one heifer since 1854. Mr. Sessions, it must be allowed, has been very successful, both as regards freedom from disease and in raising good specimens of the breed.

G. W. Convers of East Longmeadow, showed one pair of well-appearing four years old Durham steers; weight, 3,620.

George H. Estes of Springfield, had a cow, the net profit from which was in one year ninety-seven dollars and twenty-five cents, ($97.25.) She gave during the time 3,176 quarts milk.

William Birnie, of Springfield, showed thirteen Ayrshire heifers, two bulls, (young,) two cows, and one three years old bull, all carefully and skilfully bred, fine looking all. Some of the heifers, it seemed to us, were the best we ever saw of that excellent breed of cattle.

Mr. ——— Ashley, of West Springfield, showed a pair of oxen weighing five thousand and eighty lbs., (5,080.) Fat truly, but how long they had been in taking it on we did not learn.

P. Stedman & Son, Chicopee, were on hand with a Shorthorn bull, Duke of Carlisle. This animal loomed up well in a distant view, and upon a closer inspection we observed many points of excellence. The pedigree was given, which should be the case with all blood stock, as it facilitates the labor of committees.

The swinish tribe did not abound extensively.

O. H. Chapin, of Chicopee, had one litter of fair-appearing pigs, nine weeks old, Cheshire and Suffolk crossed.

J. C. Pease, of East Longmeadow, had a good boar, (Prince Albert,) nine months old.

Of agricultural implements, there were the Clipper, (appropriate name,) Buckeye, Union and Kniffin mowing machines, the Kniffin, New England and Bay State horse-rakes. Two sizes of Grant's feed-cutter, and a plough by the same exhibitor.

The fruit, flowers, fancy articles, household manufactures, vegetables, sewing machines, &c., &c., were exposed in the City Hall, which was well filled with tasty articles most tastefully arranged.

The fruit was *good* for the season.

In the display of pears, Rev. Dr. Ide, of Springfield, seemed to excel. His plates of Sheldon, Beurre Bosc, Beurre d'Anjou and Beurre Clairgeau, made the secretion vulgarily called mouth-water flow, though we made an effort to suppress it. There were excellent dishes of Rebecca, Iona, Israella, Allen's Hybrid and Delaware grapes, which strongly tempted and reminded us of the necessity of practising self-denial under the circumstances.

Apples similar to those of other localities, ordinary.

Butter, of which there was quite a display, appeared remarkably well.

The Wilbraham Manufacturing Company had on exhibition some cheese which, in our judgment, will command a high figure in market.

The ladies, too, had spared no pains to make the hall attractive by the exhibition of everything in their line, from a pin-cushion to a counterpane.

Sewing and other machines were being operated by parties interested in their sale.

On the whole, the show was a success.

Our thanks are due and cheerfully tendered to William Birnie, President Dwight, Secretary Bagg and others, for courteous attentions.

Asa Clement.

HAMPDEN EAST.

The annual exhibition of the Hampden East Agricultural Society, was holden at Palmer, October 9, upon the trotting park of that society, near the village.

The exhibition of bulls and cows was very commendable; also that of sheep and swine.

The most prominent in the department of stock, was a grand display of oxen and steers, consisting of about sixty yokes of oxen and four years old steers, nearly all of which were Shorthorn grades of a very high order, indicative to every observing mind of the superiority of blood stock.

Very fine collections of vegetables, grains and fruits, with the usual variety of ornamental contributions from the hands of the ladies, were on exhibition in the vestry of the village church.

The collection of agricultural implements was not large. Several different patterns of mowing machines were noticed. Each specimen was sustained by spirited arguments from its particular representative, setting forth its peculiar merits and advantages.

The horse department was well sustained by the character and quality of the horses on exhibition. Some very fine two years old colts, bred in Palmer, were noticed.

The track was rendered attractive by the display of good action and speed on the part of the several horses presented.

At three o'clock, P. M., we were invited to listen to an address by T. S. Gold, Esq., Secretary of the Connecticut State Board of Agriculture. Subject—"Advantages and Disadvantages of a Farmer's Life." It was full of admirable suggestions, and was eminently instructive.

My thanks are due to the officers of the society, and many other gentlemen, for kind attentions received.

JOHN JOHNSON, Jr.

FRANKLIN.

In discharge of my duty as a delegate of the Board, I visited the eighteenth exhibition of the Franklin County Agricultural Society, at Greenfield, on the 26th and 27th of September.

I found the society to be the owner of a beautiful exhibition park adjacent to the village, which, in some of its aspects, has a striking resemblance to the ancient Roman amphitheatre, and peculiarly adapted to such an exhibition; but which is hardly capacious enough to display all the domestic animals of the county, as the rapidly growing interest in agriculture and the society indicates it will be required to.

On first entering the inclosure, it was strikingly evident that I was in the company of a wide awake and thriving agricultural people, as well as that it was a gala day for the whole county. The people were there, male and female, all on the common level of intelligent humanity, all on exhibition; to see and be seen, to teach and to learn, seemed to be the order of the day. The first day, as is usual, was devoted to neat stock, sheep, swine, &c., and an address by the orator of the day, Dr. George B. Loring. The second to horses. The exhibition of neat stock was very extensive and varied. There were many specimens of all the thoroughbred breeds, and all sorts of grades and crosses. There were on the ground nine distinct herds of carefully bred and nurtured animals, four of which contained more than a hundred animals. In the important department of young stock, the exhibition was unrivalled in variety, number and quality, indicating that the farmers of the county are making a business of rearing cattle, and that skill, intelligence and thought are being directed to that pursuit. Sheep were on exhibition by the hundreds, of the fine, coarse, and middle-wool varieties, and in the departments of swine and poultry the number was large and the quality was excellent. The number of horses on exhibition the second day was large, and the animals were fine, of the several classes. This portion of the show had little of the fast horse and fast man about it, but was a commendable exhibit of the efforts of the farmers in horse-breeding, and showed skill in the selection of the stock-getters, and care and success in the rearing and training of the animals. The exhibition in the hall, of pomological, horticultural and mechanical specimens, and of domestic manufactures, was highly flattering to the intelligent skill and success of the exhibitors. It would be an arduous task to describe in detail all that was worthy and commendable in this exhibition. It was literally a cattle show, a horse show, a horticultural exhibition, and it had about it an air of life, interest and competition that indicated clearly that the people of this county are on a rapid march of agricultural improvement, and that its every department is receiving the benefit of intelligence, thought and study. Every facility was given me by the officers and members of the society to examine all departments of the exhibition, and to become acquainted with their plans of operation, and the modes by which the degree of success in the different branches of culture was attained.

L. Stockbridge.

HOUSATONIC.

Your delegate, to whom was assigned the duty of visiting the Housatonic Agricultural Society, attended at the exhibition of the society at Great Barrington on the 25th and 26th of September.

No one can enter upon the grounds of this society without remarking how strikingly they are adapted to the uses to which they are devoted. A fertile tract of land of about thirty acres, and as level as a threshing floor, affords ample space and accommodation for all the purposes of an agricultural exhibition. A range of lofty hills shuts in and seems to consecrate the spot to the uses of intelligent and scientific agriculture.

The hall, situated on one side of the amphitheatre, and provided with two covered balconies extending its entire length, furnishes excellent conveniences for the spectator to observe the different portions of the exhibition.

Of the display within the hall, the butter and cheese most attracted the attention of your delegate. There were thirty-nine lots of butter, almost all of which was of great excellence. The display of cheese was not so large, but the quality was very fine. The farmers and farmers' wives of the Housatonic Valley may well congratulate themselves on such productions of the dairy.

Without the hall there was a good exhibition of the various kinds of farm stock. The show of neat stock constituted the most noticeable part of the exhibition. The Ayrshires, Jerseys and native stock were very fairly represented. On this occasion, however, the Durhams carried off the palm. The display of this breed of cattle was large. Their full, well rounded, symmetrical and stately forms were worthy of the highest admiration. The working oxen seemed to be capable of anything that a combination of docility and immense strength can achieve. The fat cattle, from the large quantity and excellent quality of the beef they afford, cannot fail to repay the farmer for his labor and expenditure of money upon them.

There were many features of the exhibition to which your delegate would be glad to refer, but must content himself with saying generally that it was a very admirable one. This fair of the society was attended with great success, and the society has evidently been in the hands of intelligence, energy and enterprise.

Your delegate was very courteously entertained by the society, and he is under especial obligations to Mr. T. D. Thacher, of the State Board, for his kind attention.

George A. King.

HOOSAC VALLEY.

As delegate from the Board of Agriculture, I attended the annual cattle show and fair of the Hoosac Valley Agricultural Society, held at North Adams September 17, 18 and 19, 1867.

I regretted my inability to be present on the first day of the fair. By being deprived of this privilege, I failed to see the cattle and sheep on exhibition; but from the representation of officers of the society and others I learned that this part of the show was highly creditable and satisfactory.

The exhibition of horses was fine, and the colts shown gave evidence of great care in breeding, and large promise of future usefulness and beauty; and when trotted out, that their action and style might be shown, apparently elicited almost as much interest as did the trotting matches which followed.

The show in the several classes in the hall was large and creditable. Fruit, flowers, vegetables, domestic and heavy manufactures, were all in large abundance, and of high order of merit.

The society gives evidence of vital energy and thrift. The attendance at the show was large; the action of its several officers was prompt and energetic in carrying out the details of the fair. Good order prevailed, and all present seemed to enjoy the occasion.

On the afternoon of the last day Dr. Loring delivered the annual address. His subject—"Scientific and Practical Agriculture"—was listened to attentively by a large and evidently appreciative audience; and although the address was delivered in the open air, and under rather unfavorable circumstances, still the doctor held the attention of his large audience to the end.

Your delegate has no time to give a detailed account of this fair, enumerate the vast number of articles on exhibition, nor specify every interesting feature of the occasion; but would simply report, that the society, as far as he could judge, is in a prosperous condition, notwithstanding some serious drawbacks it has had to encounter, and if the liberality hitherto shown by the State in its dispensation of bounty shall be continued, it will continue to flourish and exert its wholesome influence on the agricultural interests of Hoosac Valley, and indirectly upon the agricultural interests of the State at large.

To the president and officers of the society I feel indebted for kind attention and courtesy. And especially would I return thanks to the delegate to this Board from that society, and his amiable wife, for their kind hospitality shown me during my sojourn with them.

DANIEL A. CLEAVELAND.

NORFOLK.

The nineteenth exhibition of the Norfolk Agricultural Society was held at Dedham on the 19th and 20th days of September. The weather was all that could be desired, the concourse of visitors large, and the proceedings of the fair satisfactory.

The first day was chiefly devoted to the reception and examination of articles by the various committees.

In the department of fruit, this society seems to have taken the lead of most others, to such an extent that it may be said to be its specialty. The display of 1867 was one of the best, and, in many respects, it probably surpassed all previous exhibitions of the society. The tables were, therefore, well filled, the pears alone exceeding three hundred plates, the largest number of varieties being contributed by the president, Hon. Marshall P. Wilder, of Dorchester., while F. & L. Clapp, of Dorchester, Walker & Co., of Roxbury, and Aaron D. Weld, of West

Roxbury, had very large collections, which added much to the completeness and beauty of the show.

Seventy plates of apples also graced the tables, many of the specimens being of the highest excellence, and, considering the character of the season, they were quite remarkable. In this branch of the fair, F. & L. Clapp, of Dorchester, A. F. Stevens, of Wellesley, Albert Crosby, of West Roxbury, and William Chatfield, of Dedham, were the largest exhibitors.

The season having been unfavorable for grapes, the display of this fruit was not large. N. B. White, of South Dedham, made the largest show of natives, though Warren Cobb, of Sharon, J. B. Wetherbee, of Jamaica Plain, and Timothy Phelps, of Dedham, had many fine varieties. J. W. Page, of Jamaica Plain, showed fine samples of the Dorchester seedling blackberry. George E. Leonard, of Foxborough, exhibited a stand from which hung six superb bunches of black Hamburgs and one bunch of the Grizzly Frontignac.

But two plates of peaches were presented: one by N. B. Wilmarth, of South Walpole, the other by George Hewins, of Dedham. Some fine plums were shown from the place of Col. Theodore Lyman, of Brookline.

In the floral display, the department of cut flowers was striking, contributions having been presented by George Craft, of Brookline, Mrs. George Vose, of Milton, Mrs. S. M. Stuart, of Fairmount, and others.

The show of vegetables was highly creditable, the leading contributors being John Sias, of Milton, C. G. Upham, of Needham, John W. Richardson, of Medway, and Nathaniel Smith, of Dedham.

Leaving the hall, which adjoins the grounds, we found the display of stock quite large and creditable. Fine Jerseys from the herd of Edward S. Rand, Jr., of Dedham, M. S. Scudder, of Grantville, and J. W. Wattles, of Canton, added much to the completeness and attractiveness of the show. Some good stock was also shown by Col. E. Stone and J. W. Gay, of Dedham, and Henry Goulding, of Dover.

Of horses, there were thirty-eight entries, the Morgans and the Blackhawks taking the lead. There were many superior animals.

The show of swine, though of limited extent, was of excellent quality, while Dr. Eben Wight, of Dedham, and E. P. Burgess, of the same town, made the best display of poultry, many of the specimens being of remarkable excellence.

Returning to the hall, we found the exhibition of implements the largest and most complete ever made by the society. It included an extensive list of entries by Parker, Gannett & Osgood, the Ames Plow Company, the Morse Plow Company, and others.

Among the mowing machines exhibited, we noticed the celebrated "Buckeye," made at West Fitchburg. This was in the collection of Parker, Gannett & Osgood, the Boston agents of this mower. The character of the manufacturers is a sufficient guarantee that it is made on honor, and it gives such universal satisfaction that it is gratifying to see it constantly improved and made with such faithfulness and care.

The ploughing match was arranged for 2 o'clock, on land of Dr. J. H. Harrington, not far from the society's grounds. There were thirteen entries, of which five were of double teams, four double ox-teams, and four single horse-teams,—each team being required to plough one-eighth of an acre. The work was done in a satisfactory manner by most of them, notwithstanding the rocky character of the soil.

The morning of the second day was devoted to the exhibition of horses on the track, which drew together a large crowd of visitors, and to the annual address and dinner in the hall. A procession was formed at 12 o'clock, under the direction of Col. John W. Thomas, high sheriff of the county, and proceeded to the dining-room in the upper part of the hall, where a bountiful repast was provided under the immediate direction of the officers of the society. After an appropriate address of welcome by the president, Marshall P. Wilder, in the course of which he announced that the society was out of debt, and the invocation of the divine blessing, full justice was done to the collation, when Charles L. Flint, Secretary of the State Board of Agriculture, was introduced to the large audience as the orator of the day. The address was direct, pointed and practical, and was listened to with undivided attention to the end.

Shorter speeches followed, making all the exercises in the highest degree satisfactory.

This society seems to be accomplishing its work successfully. It has manifested great energy in overcoming all obstacles and gaining a reputation, in many respects higher than that of most other societies in the State. Much of this is due to its indefatigable president, and to its accomplished secretary, H. O. Hildreth, Esq., of Dedham. To these officers and to many others we are indebted for kind attentions.

WILLIAM KNOWLTON.

BRISTOL.

Delegated by the State Board of Agriculture to attend the Bristol County Fair, and having been kindly furnished by Mr. Charles Talbot, the secretary, with tickets of admission and time-tables of the railroads, I reached Taunton on the morning of October 1st, the first day of the fair.

I had no difficulty in finding the grounds, as the weather was fine and everybody was going, so I had only to follow the crowd. I found the entrance lined by a beautiful grove which, though containing some underbrush and a surface somewhat uneven, afforded a fine shade for horses. With a moderate sum expended in clearing up, grading and providing seats at suitable places, this part of the inclosure might be made more useful and attractive.

I soon recognized Mr. A. P. Slade, of the State Board, and acting president in absence of Mr. Ames, who, together with Mr. William P. Hood, of the committee of arrangements, accompanied me to witness the ploughing match. There was a goodly number of competitors for premiums, and the work was well done with Mead's conical plough, which was the only one used in the trial, I think. We were pleased to see such an interest manifested in the ploughing by the farmers; for although it occurred in the early part of the day, there was a large gathering present to witness the trial. We were also pleased to see that in most instances the farmers or their sons were holding the plough instead of a foreign laborer, not forgetting Franklin's adage, that

> "He that by the plough would thrive,
> Himself must either hold, or drive."

The skilful guiding of the plough should be considered as valuable an accomplishment to the practical farmer as producing a two-forty gait from a worthless nag. A ploughing-match should be included in the programme of every agricultural fair.

The exhibition of town teams on the track consisted of eighty-four yoke,—thirty-three from Taunton, twenty-three from Norton, sixteen from Raynham, and twelve from Rehoboth. They were preceded by the band, and made a very fine display. Most of these were native, and were not, as a whole, of a superior quality. There were, however, a few very fine yokes of thoroughbreds.

There was in the pens a good show of stock. The yoke of cattle exhibited by Mr. Jonathan Slade, of Somerset, weighing fifty-three hundred pounds, attracted much attention. There was also on the grounds from the State Lunatic Asylum, a fine yoke of fat cattle, one of which dressed, on the first of this month, two thousand and four pounds.

Of cows and bulls there was not a large number of entries when compared with other divisions; but some good specimens of the Alderney, and also of the Ayrshire cattle, which seemed to be the favorite breeds.

There was a good exhibition of coarse-wool sheep, but I was surprised not to see a fine-wool sheep on the grounds, and still more so when informed that there was not a hundred in the county.

There was the longest row of poultry cages we ever saw at any fair, and it attracted a crowd of bird-fanciers, who engaged in animated discussions upon the relative merits of the different families.

There was also a good exhibition of swine.

Of the horses and the trotting we will not attempt a description, as we are not accounted a good judge of horse-flesh; but we do not wish it understood that they have no fine horses or fast trotting in Bristol, for an examination of the programme will satisfy those who wish to see what Josh Billings denominates a "purely agricultural horse trot," that by attending the Taunton show they can be treated to that kind of amusement at all hours, like the hungry public with meals at the village restaurant.

There was a good collection of agricultural implements in the lower story of the hall. This is a department not generally appreciated by the farmers, and, in many of our fairs, consists of some half a dozen articles, which are frequently crowded in some corner by the managers, or disposed of in some out-of-the-way place, where they are scarcely noticed.

The exhibition of heavy manufactures, for which this society is notorious, we were informed was not as good as in former years; but we think it would have been hard to beat this year. The finely polished and beautiful parts of a locomotive, by Mr. William Mason, of Taunton, and also the case of silver ware, attracted and deserved much attention.

Among the vegetables, the collection of one hundred and seventy-three varieties of Mr. Charles Albro, of Taunton, was conspicuous.

The divisions above noticed, together with the household manufactures, works of art, flowers, fancy articles contributed by the ladies, and that of bread, butter, cheese and honey, (of which there was one thousand pounds,) and the best collection of fruit we ever saw, well filled the second story of the hall,—100 by 160 feet,—and could not possibly have been placed in an ordinary sized hall.

The society have expended, the past year, in building a large and commodious barn, purchasing 12 acres of land adjoining their grounds, and other improvements, about five thousand dollars. They now have sixty-three acres, on a part of which a fine opportunity is presented for experiments in draining and other improvements.

We were pleased with the interest manifested by the managers, the clock-like manner in which the arrangements were carried out, and the general order which prevailed. During the two days that we attended, we did not see a single person intoxicated, and scarcely heard an oath. We hope the delegate next year will be able to say the same.

We cannot close our Report without noticing the annual dinner, which was served on the second day in the third story of the hall, which is commodiously arranged, and devoted exclusively to that purpose. The farmers of Bristol, with their wives and daughters, seated at seven hundred feet of table, was really the best exhibition at the fair, and must be seen to be appreciated. After all had been supplied, Dr. Loring delivered an excellent address.

After taking a view of the people,—which were estimated at fourteen thousand,—from the window of the hall, we wended our way to the depot, fully believing that the Bristol show is what its officers claim it to be—one of the best exhibitions in the State.

We were obliged to leave at the close of the second day, and cannot report the proceedings of the third. We are informed that the receipts of the society were nearly $8,000.

Every attention was rendered by the officers of the society to render our visit agreeable, and we shall always remember our trip to Taunton with pleasure.

John L. Cole.

BRISTOL CENTRAL.

The eighth anniversary of the Bristol County Central Agricultural Society was held at Myrick's September 19, 20 and 21, under a favorable sky, abundance to be seen, and a jolly crowd assembled.

Agreeably to appointment your delegate was early upon the grounds, where he soon met the good-natured smile of the president, making all happy about him.

This being the first report that has been presented this department from the Bristol Central Society, it will be proper for me to state, that although the society has been in successful operation for the last eight years, it has never before received the State bounty or a visitor from the State Board, but has, by its own independent action, succeeded in placing its annual exhibition among the most prominent in the State.

The site selected is beautiful, and well adapted for the purpose required, with a substantial fence inclosing about forty acres, upon which is erected their magnificent hall, one hundred and fifty feet long and fifty wide, two stories high, with an ell part attached, the granite structure of which indicates most decidedly the permanent design of the founders of the institution. The stables are numerous and commodious, built partly of stone, furnishing comfortable quarters for the horse, with a passable chance for the jockey and worshipful owner. The trotting course is all that could be desired for the exhibition of the horse.

I learned indirectly that the whole was bought and constructed at an expense of about twenty thousand dollars, drawn from the deep pocket of their president, which sum the society has continued from year to year to refund, and now have only five or six thousand remaining unpaid. The noble principle of generosity and persevering determination that knows no motto but success, has placed this society upon the permanent basis on which it is now represented.

My attention was first given to the thousand and one articles on exhibition in the hall, which, being large, gave abundant room for the many varieties of the useful, curious and ornamental,—among which could be found the most approved patterns of ploughs, mowing-machines, horse-rakes, carriages, &c.; the various productions of the different manufacturing companies in that section, iron, cotton and wool; the products of the field and garden, bread, butter, cheese, honey, vegetables, fruit and flowers,—all occupying the place assigned, doing credit to the producer and honor to the exhibition.

The ladies contributed many specimens of household manufacture,—painting, drawing, needle, wax, cone and shell work, &c.,—which were admired by all that passed that way. And a greater contribution still was their glorious presence, crowned with smiles of encouragement.

The exhibition of cattle was large, especially of oxen. The best working cattle upon the ground were grade Devons. I am sorry to note that there seems to have been a want of interest in this department in former years, as much the largest portion was native stock, or slightly mixed with the improved breeds of the present day. I noticed, however, the march of improvement had already begun. Among the younger stock could be seen good specimens of the more popular breeds, which will, ere long, change and improve the whole.

The show of swine was really enormous, and poultry the best I ever saw, while sheep were scarcely represented at all, leaving a wide margin for improvement.

The horse seems to be a great pet in Bristol County. I think some class was on exhibition constantly during the three days' fair, and am able to report a very fine show of the most fascinating animal upon earth—the horse. My attention was called to several popular stallions, and stylish breeding mares with genteel stepping colts of different ages by their sides; also, the heavy draught horse, the walking horse, the fast trotter and racer,—all having their admirers about them. The raising of good horses should be encouraged, as no civilized community can do without them, and this must ever be one of the most important branches of farming. Speaking of good horses, I mean such as can be made useful, possessing a suitable combination of strength, speed and endurance.

At two o'clock, on Friday, an hour was occupied by the speakers of the day. Governor Bullock told us that agriculture needed special encouragement. President Clark told us of an agricultural college, and promised to educate our sons that they might be farmers. Hon. Mr. Eliot spoke of the dark past and the bright future. Dr. Loring spoke of the rapid progress of agriculture. As an illustration, he told us that when the prophet Elisha was called to the Lord he was found ploughing with twelve yoke of oxen. "No wonder," he said, "that he quit farming and went to prophesying, if it took twelve yoke of oxen to draw the ploughs of those days."

In general terms, I can state that progress is the motto here. Where squashes are produced that weigh 175 pounds; where hogs weigh 1,000 and steers 5,300; where 120 yoke of oxen are upon the grounds at once; where the Devon, Ayrshire, Shorthorn and Jerseys are taking the place of the sharp, thin, slab-sided cattle of other days; where horses want only two minutes and twenty-six seconds to trot a mile; where from two to four thousand people assemble daily; where such men as Nathan Durfee are elected for president; where Bullock, Clark, Eliot and Loring come to visit the exhibition and address a fitting assembly, I may as well state such an exhibition was a success, and its officers and members may be proud of what they have already accomplished.

In closing I wish to express my thanks to families whose generous hospitality your delegate enjoyed.

M. F. Watkins.

PLYMOUTH.

As delegate from the Board of Agriculture, I attended the annual exhibition of the Plymouth County Agricultural Society, held at Bridgewater, on Thursday, Friday and Saturday, September 26, 27 and 28. I was present on the morning of the first day, and remained till the afternoon of the second.

This society have very ample accommodations for holding their fairs, having a lot of land containing nearly seventy acres, with a spacious hall upon an elevated portion of the inclosure, which overlooks almost the entire grounds. The hall is two stories high. The lower one is used for the exhibition of the products of the farm and garden; also the handiwork of the ladies, the skill of the mechanic and manufacturer. The display of butter and single dairy cheese was very fine. The rich, golden butter I think was as handsome as I ever saw.

There was a very large display of bread,—showing the skill of the ladies, and the interest they take in this part of the exhibition, which is very commendable. Without good bread and butter for our tables, other food would seem hardly palatable. The display of fruit was not large; but judging from the looks, the quality must have been good. The apple crop suffered perhaps more in the eastern, than middle and western sections of the State. The display of flowers was fine, and attracted much attention from the numerous visitors who thronged the hall. The display of inventions, agricultural implements, and manufactures was not large, although the general appearance of this part of the exhibition was good, and worthy the efforts of this or any other agricultural society.

First in the programme outside the hall was the ploughing match, which was contested by ten teams:—seven pairs of oxen, two pairs of horses, and one three horse team. The land selected for the trial was low and rather wet, with a turf not very strong, which required more care and skill of the ploughman to lay the furrows handsomely. It, however, was all so well done, that it seemed to me that the committee who had charge of this department must possess wonderful powers of discrimination to be able to decide who should be first and who second, until they should complete the list of awards. There were eight premiums, leaving two teams to try their skill at the next fair.

I next proceeded to the stock pens, where in cattle I found the Jersey largely to predominate. In sheep, Oxford and Southdowns with a few Leicesters. In the department of swine there were all ages and conditions, from those of mature years to those whose first breath was drawn upon the society's grounds. They were chiefly of the Chester County breed. The number of cattle on the ground was not far from one hundred. A large proportion of them were dairy and breeding animals. I have spoken of the Jersey as predominating. These are not so symmetrical in form or gigantic in proportions as the Shorthorns of the Connecticut Valley and many other portions of the State. But when I heard the reports of the richness of the milk, and saw the golden butter in the hall, I was led to believe that the Jersey stock was by no means to be despised.

The exhibition of horses received its due share of attention. Some splendid matched and single horses were put on the track. The society have a splendid place for showing their horses, and it is evident that this animal is by no means neglected in this part of the State.

In the department of poultry there was a large exhibition, larger I think than I have seen at any other fair. There were the large Brahmas, Dorking, Black Spanish, and other varieties down to the Bantams, which, although of small proportions, seemed to say by their shrill notes that they were worthy of our especial attention.

At twelve o'clock the second day, the officers, members of the society and others, were marshalled in procession and marched to the hall, where a sumptuous dinner had been prepared for the occasion. After discussing the viands of the table for half an hour, the attention of the assembly was called to brief addresses by the president of the society and others. During the continuance of the fair, the Society held their annual meeting; and after electing their officers, voted unanimously to appropriate $200 annually for the establishment of scholarships in the agricultural college. The reports of the society showed that their receipts last year for entrance fees and at the hall amounted to over $4,500, and that the ground rents for tents were over $1,000.

It was estimated that there were not less than eight thousand on the ground the second day of the show this year, which showed the interest people in that section of the State take in cattle-shows.

I understood that on Saturday there was to be a farmers' meeting for the discussion of various subjects pertaining to practical agriculture, or any subject connected with the interests of the society; but as I left the evening previous, can give no account of their meeting, but must rest satisfied with this hasty sketch of what I saw and heard while in Bridgewater. N. S. HUBBARD.

BARNSTABLE.

It was my privilege as a delegate from this Board to visit the annual exhibition of the Barnstable Society. It gave me the greater pleasure to visit that county, and attend their fair, because it was the birthplace of my parents, on both sides, and having a desire to compare notes with the Cape farmers and observe the interest taken in agricultural pursuits at the east. The days of the fair were unusually fine for the season, and everything was favorable for the exhibition. At the starting point I tried to keep in mind that farming is not the principal business of the men of that county, therefore I must not expect too much from them in their operations upon the land. The exhibition of cattle on the grounds was not large, but in most instances of very good quality and of good growth; and yet a breeder of Shorthorns might have thought the stock in most instances small, compared with his own. Having spent two days visiting different parts of that section, I was fully prepared in my own mind to witness a small exhibition of working oxen, and found but four or five pairs upon the ground, where in Berkshire County, oxen being extensively used, we might expect a larger exhibition of that class. Some fine cows and bulls, mostly grades, were upon the ground, and also some fine sheep and swine.

It was not my privilege to observe the ploughing match, not having been notified at what hour it would take place. Only one team entered for competition. After the work had been done, I visited the ground ploughed, and found it well done in all respects. I now enter the hall and find one of the best exhibitions of fruit and vegetables I ever witnessed. The variety of Porter apples exhibited, exceeded anything I ever saw. I noticed some sweet potatoes raised there, which would compare with any Delawares or Carolinas. The ladies evidently intended to sustain their part in the hall exhibition. The needle-work and also artificial flowers furnished by them, served to interest the eyes of all beholders.

The dairy department was also well sustained, both in the exhibition of cheese and butter, and in fine, in all the departments in the hall a well cultivated taste and a well directed effort has made the ladies' department a perfect success.

I now come to the last part of the programme, yet not the least interesting. I allude to the custom of the members meeting in this upper hall, with their wives and children, to surround the tables loaded with the substantial and inviting viands and luxuries to refresh the inner man.

This was the pleasantest feature your delegate ever noticed at any of our fairs. I think one of the greatest blessings arising from our societies is derived from the social influences which ought to be felt in thus mingling together. Let us as men renew our acquaintance with each other, from time to time, exchanging thoughts also upon the interests of agriculture, and give and receive such information as we may have gathered since the last annual festival. But let us never forget that our ladies are entitled to the same privileges of social life and festive gatherings, that we of sterner natures feel the necessity of, for our own good. After the dinner was over, the annual address was delivered by the Rev. James F. Clarke, of Boston. It was an interesting, able and instructive discourse, and listened to with marked attention by his audience. After the address proper, the Hon. T. D. Eliot, M. C., and others, followed in short speeches, thus closing the exercises of the day.

In the evening, as is the usual custom, a large company gathered to spend a *short time* and perhaps longer, in the pleasures of the dance. But as your delegate did not receive an early education in that art, he did not feel at liberty to engage with the merry party, lest he might prove a stumbling block in the way of enjoyment; and yet your delegate enjoyed the sight of such a party as well as could be expected by one not instructed in that accomplishment. I have but to return my thanks to our associate, George A. King, and to the president, N. Hinckley, Esq., for their kindness to me while I remained with them.

T. D. Thatcher.

NANTUCKET.

The twelfth annual exhibition of the Nantucket Agricultural Society was held on the grounds of the society on the 25th and 26th days of September; and notwithstanding the forbidding appearance of the weather in the morning, the Nantucketers, who are accustomed to wet, being entirely surrounded by water, failed not to appear in good time and in good numbers to enter into the toils and festivities of the occasion.

A spirit of laudable ambition was brought to the fair in the hearts of those who had long anticipated the day when each would vie with his neighbor and rejoice the heart of his companion.

The clouds passed away, and left the afterpart of each day joyous in the rays of the great luminary, and the faces of those present beaming with delight and in thanksgiving to Him who rules the destinies of man, that He had vouchsafed to them the clear air and the refreshing breeze, which gave to all surrounding objects a beauty which they had feared would appear in but simple deformity.

The occasion was honored by the presence not only of the dwellers on the island, but by a goodly number from various sections, whose presence added to the pleasures of the day. That strangers should be attracted to this place, is not to be wondered at, when we consider the many beauties it is capable of introducing to the eye and to the understanding.

The cattle presented for exhibition discovered a laudable enterprise in the farmers of Nantucket. But few animals were on exhibition that would not grace the pens at any county show. Most of the superior stock was of the Alderney and Ayrshire breeds, which seem to be better adapted to that locality than are the Durhams. There were some very fine specimens of Ayrshires exhibited by Manuel Enas and A. M. Myrick. Superior Alderney stock was exhibited by James Thompson, Esq., president of the society, and by A. Franklin and Edward Hammond.

The enterprise of these gentlemen in the way of stock-breeding is doing much to benefit that society, and through it the community at large.

It is difficult often for us to break away from our own old habits, or to get out of the track trod by our fathers. This may be a reason why so few of our worthy agriculturists do not enter more readily into the improvement of their herds of cattle. The cost of keeping the improved and approved breeds is no more than that of the less approved. When every farmer shall have looked to his own interest in this matter, we shall find our pastures covered with better stock, and our stalls filled with that wherein lies the stock-breeder's pride—sleek, handsome, productive animals.

I would by no means be thought to speak lightly of grade stock. I admire such—the higher the grade the better; but of none do I think so highly as I do of the thoroughbred.

Many fine grade animals were on exhibition—animals that the owners may take pride in; but that pride cannot well compete with the pride of the thorough-breeder.

Attention was drawn to three native buffaloes offered on exhibition, one six and two eight years old. With what success and with what profit these animals can be reared on the island I am not able to report.

This island seems to be capable of producing fruits, not only of the animal and vegetable kingdoms, but a multiplied variety of handiwork, as was manifest by the exhibition of fancy articles by the ladies, all very good, much of it very creditable to the milder sex and better *half* of creation.

There seemed to be no lack of skill in the various arts. In the hall of exhibition were eel-spears and photographs, rattan baskets and huckleberries, miniatures on porcelain and seives, and a great variety of useful as well as ornamental articles.

This society, as well as some other societies in the State, offers premiums on reports—for the best report. This practice will tend to elevate the mental capacity of the society in the estimation of the public.

One great failure in those who write reports awarding the premiums offered by agricultural societies, is they fail to report anything but the award. They do not give the reason for the award, which the public is justly entitled to. Perhaps they cannot do this, for the fact that the competitor himself fails to give the facts that are important for the reporter to know before he reports. All the facts that are important in the case should be placed in the hands of the committee by the competitor.

Such as the following is often the case: "To B we award the first premium for the best fat cow, $3; for the best fat hog, $4."

These seven dollars which are awarded to B, did once belong to the State, and were given to the agricultural society that it might in return benefit the public. The society has given them to B because he had the best fat cow and the best fat hog. How is the public benefited by these facts? The important facts are yet behind the curtain. The public want to know—the State is entitled to know—what B has done, and how long he has been doing what he has done, to entitle him to these seven dollars.

The general features connected with the exhibition at Nantucket, were highly commendable. They have ample grounds and a good track, and on this occasion it was sacred to worth and merit.

Scrubs, old pelters and useless animals were not there. The family horse, the farm horse, the good trotter, the saddle horse, the fast walker, and the horse for all work were there. For general purposes, the horse perhaps, of all animals, stands in the first rank. He is an animal that no class in society can well do without. He is used in the ordinary service, and may be in all the service on the farm.

He is used by the man of business and the man of pleasure. Like other beasts, he was given for man's use, not for his abuse. The fact however cannot be denied, that through man's impetuosity, he is often made to suffer.

It is very desirable that more attention should be given to the breeding of horses. The horse for all work is what we most need—the good roadster is strongly desired, while the race-horse, fit only for the turf, does not come within the catalogue of our necessities. Yet the ambition of many is to urge this class of horses into the foremost position of some of our agricultural exhibitions, to the detriment of other animals of use to the farmer. The only race that was run at the Nantucket exhibition, was by three pedestrian competitors, on the half mile track. The first prize of $3 was won by Alvin Hull, of Nantucket, time $2\frac{40}{60}$ minutes.

The second prize of $2, was won by William Eaton, of Sandwich. The novelty of this part of the exhibition caused some excitement for the moment.

The plough was but little used. Only two entries for oxen, and one entry for horses, were made, all of which competed for the prize, and each gained it, though not the first prize.

The display of fruit was very commendable, considering the season. Pears were offered by Henry Coffin, and Samuel King, twenty-three varieties each. James Thompson offered sixteen varieties, and E. H. Alley offered fifteen varieties. Fine specimens of the pear were offered by various other individuals.

Apples of different kinds and grapes of various hue and cluster, the flavor of which in connection with that of the quince and the peach (all of which were truly good specimens,) filled the air with a perfume that drew the multitude together, and so did the Nantucket glee club, which made the air to ring with strains most charming.

To be particular to notice everything that was exhibited, will require more time than will be profitable to spend at the present time, but we must be allowed to say, that the bread and butter commended not only themselves, but those who made them, to the favorable consideration of all who may chance to seek such skilful hands.

The farmers' holiday being past for the season, it is natural and profitable to look back to the occasion and ask ourselves what all this has profited us. No reflecting, unbiased mind can ponder the scenes through which we have passed, without gathering some ideas that will be useful to him.

Not only have there been trials of skill and trials of strength exhibited, but man's inventive genius has been brought to the test. It is impossible for a man of inquiring mind to have viewed all that has passed before him without in some way being profited,—without adding something to the amount of his knowledge, however great that knowledge may have been.

These are occasions on which comparisons are made, and with a small degree, even, of emulation, a man will imbibe some new idea that will occupy his mind during his leisure moments.

From thence arise the good fruits of these exhibitions, and he is a dolt who will not partake of them.

Thomas W. Ward.

MARTHA'S VINEYARD.

The tenth annual exhibition of the Martha's Vineyard Agricultural Society was held on the 15th, 16th and 17th of October last. It was my privilege, as a substitute for my friend Sewall, to land upon this island of the sea on the morning of the 15th.

Although limited in territory, this island possesses many interesting features which claim our consideration. Its inhabitants have long been reputed for their hospitable and generous character. They have heretofore derived most of their income from the treasures of the ocean. They have been more accustomed to ploughing the sea than the land. Deprived, in a great measure, of intercourse with the surrounding country, they find, when at home, a community within themselves. Here is the true secret why this society, with its limited resources, has prospered to such an extent. It is a family concern; each one seems desirous to add something to make the occasion instructive and interesting; no one has the fear that their offering, however small, will be overlooked, or that they would have occasion to say, It is no use for me to contribute, so long as some more favored one will claim the merit. One of the most interesting and encouraging features in this exhibition was the great number of contributors and variety of contributions. The ladies were there in their every-day costume, not as carpers and idle spectators, but anxious to show us their bread and butter, paintings and drawings, preserves, pickles and wine, fruits and flowers, and more especially their wonderful skill in domestic manufacture and fancy articles, slippers, shawls and tidies, mats and rugs, quilts and cushions, sacks and socks, in fine, articles too numerous to mention, all useful and ornamental.

The specimens of butter were very numerous,—not in large quantity, for I understand that two pounds was sufficient to enter for premium.

In the department of fruit, the specimens of apples and pears were quite numerous and of excellent quality.

The example of a few enterprising men has already produced a wonderful change in the agricultural products of the island; lands once barely worth possessing are now found capable of producing some of the choicest fruits of the earth.

Retired sea-captains find it profitable to devote a part of their hard earnings to the cultivation of the soil. Corn, rye, oats and vegetables of every description are produced, not surpassed in any section of our Commonwealth. A vast area of land, now lying waste and desolate, might be made by the hand of culture to yield abundant harvests. Enough has already been done to illustrate what can be done.

The stock exhibited did not come up to the standard I had expected. Although measures have been taken to introduce the breed of Ayrshires upon the island, still I think not with that success desired; they did not seem fully developed, owing, no doubt, in a good measure to their care and keeping. The sheep were of a very inferior quality, although they boast of most excellent mutton.

The whole island might be converted into one great sheep pasture, where with care and attention, some of the finest breeds, such as Merinos and Southdowns, might be raised to profit. Let some enterprising farmer set the example, and before many years this island could boast of as fine sheep as the hills of Vermont.

In closing this Report, I would express my gratitude for the kind and hospitable manner in which I was received. Especially my thanks are due to the family where I found such a pleasant and cheerful home.

NATHAN DURFEE.

RETURNS

OF

AGRICULTURAL SOCIETIES,

FOR 1867.

FINANCES.

SOCIETIES.	Amount receiv'd from the Commonwealth.	Income fr'm permanent fund.	New members & donations.	All other sources.	Receipts for the year.	Prem's offered.	Prem's and gratuities paid.	Current expen's for the year—not including premiums and gratuities.	Disbursem'ts for the year.	Indebtedness.	Value of real estate.	Value of personal property.	Permanent fund.
Massachusetts, .	-	$4,102 08	-	$2,136 35	$6,238 43	$1,450 00	$748 00	$5,496 14	$6,334 14	-	-	$55,223 92	$55,223 92
Essex, . . .	$600 00	828 30	$312 00	1,936 42	3,676 72	2,079 00	857 20	1,893 59	2,750 84	-	$6,000 00	11,524 58	17,524 58
Middlesex, . .	600 00	51 87	1,113 00	2,945 24	4,710 11	1,198 00	881 50	1,466 71	2,290 54	-	8,000 00	1,000 00	9,000 00
Middlesex North, .	600 00	-	202 50	3,699 20	4,501 70	850 00	528 75	1,164 75	3,388 05	$1,800 00	7,098 24	805 69	7,903 93
Middlesex South, .	600 00	-	83 07	1,139 94	1,823 01	1,087 00	507 62	677 08	2,463 77	2,340 76	9,300 00	1,100 00	10,400 00
Worcester, . .	600 00	-	600 00	3,931 52	5,131 52	1,537 25	1,517 75	1,262 26	4,329 23	3,500 00	22,000 00	500 00	15,000 00
Worcester West, .	600 00	188 00	51 00	3,054 45	3,893 45	1,303 00	1,022 00	1,552 67	3,286 17	5,760 00	14,350 00	1,127 45	8,590 00
Worcester North, .	600 00	288 03	2,402 50	2,880 73	6,171 26	1,706 75	1,051 87	2,143 86	11,487 06	-	8,730 00	270 00	9,000 00
Worcester N. West,	-	32 16	245 25	158 63	393 88	143 00	77 33	161 87	239 20	-	-	300 00	1,093 70
Worcester South, .	600 00	298 08	83 00	142 00	1,123 08	945 00	655 70	527 36	1,183 06	-	2,300 00	2,113 58	3,552 00
Worcester So. East,	600 00	-	86 00	3,078 09	3,664 09	1,231 25	726 22	1,113 17	-	4,500 00	8,000 00	589 80	3,500 00
Hampshire, Hampden & Franklin, .	600 00	148 00	237 00	1,568 90	2,553 90	966 50	827 00	1,240 48	2,840 10	3,050 00	8,000 00	5,000 00	4,000 00
Hampshire, . .	600 00	563 56	67 50	578 46	1,844 52	1,087 00	852 02	883 54	1,735 56	-	5,500 00	550 00	6,050 00
Highland, . .	600 00	79 74	40 00	533 82	1,254 56	752 50	447 00	731 06	1,178 06	-	3,000 00	1,800 00	4,800 00
Hampden, . .	600 00	-	62 50	15,388 05	16,050 55	1,893 50	712 50	16,834 05	17,546 55	19,600 00	35,000 00	350 00	26,600 00
Hampden East, .	600 00	125 00	118 00	187 00	1,030 00	950 00	458 00	133 37	591 37	970 00	6,000 00	250 00	4,500 00
Union, . . .	-	-	-	-	62 90	18 00	18 00	25 25	43 25	500 00	1,000 00	1,000 00	1,509 65

Franklin, . . .	$600 00	$50 00	$238 75	$1,149 38	$2,038 13	$1,105 50	$738 25	$1,044 10	$1,782 35	-	$7,000 00	$1,000 00	$8,000 00
Housatonic, . .	600 00	-	261 68	3,776 23	4,637 91	2,275 00	1,806 00	2,594 63	4,477 95	-	8,000 00	75 00	24,000 00
Berkshire, . .	600 00	600 00	200 00	2,235 51	3,635 51	2,300 00	2,024 50	1,478 28	3,492 78	-	10,000 00	2,500 00	10,000 00
Hoosac Valley, .	600 00	150 00	428 00	1,421 63	2,599 63	1,472 50	1,187 00	4,134 96	5,320 96	$4,485 00	8,000 00	200 00	3,515 00
Norfolk, . . .	600 00	-	353 00	2,781 02	3,734 02	1,728 75	918 55	2,783 13	3,701 68	-	10,414 00	350 00	10,414 00
Bristol, . . .	600 00	-	2,458 00	7,216 00	10,274 00	1,750 00	1,255 50	5,016 84	6,272 34	9,458 00	30,822 51	4,914 53	26,279 04
Bristol Central, .	600 00	-	163 00	4,378 94	5,141 94	1,457 75	1,850 50	2,608 28	4,458 78	5,261 14	17,627 87	1,000 00	13,366 73
Plymouth, . .	600 00	209 14	449 00	7,096 26	8,344 40	2,470 50	1,902 78	1,568 54	8,777 69	-	22,000 00	1,000 00	23,000 00
Marshfield, . .	-	-	600 00	1,184 13	1,784 13	281 50	213 25	891 72	1,529 00	30 00	1,731 78	578 07	2,101 33
Hingham, . .	-	-	-	-	26,432 17	1,143 26	-	1,214 83	25,180 97	4,000 00	21,406 15	3,036 00	17,406 15
Barnstable, . .	600 00	40 00	30 00	808 40	1,438 40	700 00	424 61	1,015 87	1,440 48	802 08	6,000 00	300 00	6,000 00
Nantucket, . .	600 00	171 46	22 00	348 57	1,142 03	996 25	506 75	734 28	1,241 03	-	3,409 00	767 92	3,976 92
Martha's Vineyard,	600 00	568 50	238 65	170 02	1,577 17	648 50	610 27	1,041 98	1,658 25	250 00	3,400 00	2,575 46	5,975 46
Totals, . . .	$15,000 00	$8,493 92	$11,145 40	$75,924 89	$136,712 92	$37,527 26	$25,326 42	$63,435 65	$128,019 21	$66,306 98	$292,089 55	$101,902 00	$342,282 41

PERMANENT FUND—HOW INVESTED.

MASSACHUSETTS.	In bank stock, Insurance Co., and U. S. and Boston bonds.
ESSEX.	In bank stock and railroad bonds.
MIDDLESEX.	In real estate, mortgage and personal property.
MIDDLESEX NORTH.	In land, buildings and personal property.
MIDDLESEX SOUTH.	In land, buildings, pens and fixtures.
WORCESTER.	In real estate.
WORCESTER WEST.	In real estate and fixtures.
WORCESTER NORTH.	In permanent grounds, notes and cash.
WORCESTER NORTH-WEST.	In notes.
WORCESTER SOUTH.	In hall, furniture, pens, and loan on security.
WORCESTER SOUTH-EAST.	In real estate.
HAMPSHIRE, FRANKLIN AND HAMPDEN.	In notes and mortgages on real estate.
HAMPSHIRE.	In hall and grounds.
HIGHLAND.	In U. S. bonds, secured note, deposit, and members' notes.
HAMPDEN.	In land and buildings.
HAMPDEN EAST.	In real estate, cattle pens and fixtures.
UNION.	In park, and notes on demand.
FRANKLIN.	In grounds, and bank stock.
HOUSATONIC.	In real estate and notes from members.
BERKSHIRE.	In real estate.
HOOSAC VALLEY.	In real estate.
NORFOLK.	In real estate occupied by the Society.
BRISTOL.	In farm, buildings, personal property and cash.
BRISTOL CENTRAL.	In real estate, farm and buildings.
PLYMOUTH.	In real estate, furniture and fixtures.
MARSHFIELD.	In real estate, personal property and cash.
HINGHAM.	In hall and grounds.
BARNSTABLE.	In land and buildings.
NANTUCKET.	In real estate, U. S. bonds and cash.
MARTHA'S VINEYARD.	In hall, cattle pens, fixtures and notes.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.

FOR FARMS, FARM IMPROVEMENTS, MANURES, &c.

SOCIETIES.	For managem't of farms.	For draining.	For subsoiling.	For ploughing at the exhibition.	For reclaiming swamp lands.	For experime'ts with manures.	For spading.	For hedges and ornamental trees.	For reclaiming old pastures.	For orchards of all kinds.	For cranberries.	For other farm improvements.	Total amount offered for farm improvements.	Total am't awarded for farm improvements.	Total am't actually paid for farm improvements.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$30 00	-	-	$156 00	-	-	-	-	$15 00	-	-	-	$306 00	$201 00	$201 00
Middlesex,	-	-	-	53 00	-	-	-	-	-	$26 00	-	$35 00	238 00	114 00	114 00
Middlesex North,	-	-	-	27 00	-	-	-	-	-	-	$5 25	-	54 00	32 25	12 00
Middlesex South,	-	-	-	37 00	$10 00	-	-	-	-	20 00	-	-	229 00	67 00	63 00
Worcester,	-	-	-	64 00	-	-	-	-	-	-	-	-	74 00	64 00	64 00
Worcester West,	-	-	-	45 00	-	-	-	-	-	-	-	-	110 00	45 00	45 00
Worcester North,	25 00	-	-	29 00	-	-	-	-	-	-	-	-	144 00	54 00	54 00
Worcester North-West,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worcester South,	-	-	-	54 00	-	-	-	-	15 00	-	2 25	-	102 25	71 50	71 50
Worcester South-East,	-	-	-	104 00	16 00	-	-	-	-	-	6 00	-	212 00	126 00	124 00
Hamps. Franklin & Hampd.,	-	-	-	-	-	-	-	-	-	-	3 00	-	43 00	3 00	3 00
Hampshire,	-	$20 00	-	-	-	-	-	-	-	-	-	1 50	137 00	21 50	21 50
Highland,	-	-	-	-	-	-	-	-	-	4 00	50	-	33 00	4 50	4 50
Hampden,	-	-	-	16 00	-	-	-	-	-	4 00	-	-	131 00	20 00	17 00

Hampden East,	-	-	-	$19 00	-	-	-	-	-	$6 00	-	-	$187 00	$25 00	$25 00
Union,	-	-	-	-	-	-	-	-	-	-		-	-	-	-
Franklin,	-	-	-	-	-	-	-	-	-		-	-	53 00	-	-
Housatonic,	-	-	-	46 00	$3 00	-	-	-	-	-	$5 00	-	115 00	56 00	56 00
Berkshire,	$50 00	-	-	46 00	10 00	-	-	-	-	-	36 00	-	142 00	142 00	142 00
Hoosac Valley,	-	$15 00	-	-	12 00	-	-	-	-	15 00	-	$14 00	56 00	40 00	40 00
Norfolk,	-	-	-	84 00	-	-	-	-	-	-	-	-	364 00	84 00	98 00
Bristol,	-	-	-	90 00	-	-	-	-	-	20 00	-	-	334 00	110 00	110 00
Bristol Central,	15 00	-	-	48 00	-	-	-	-	-	-	3 75	-	230 00	66 75	66 75
Plymouth,	-	-	-	47 50	-	-	-	-	-	-	30 00	-	186 00	76 50	76 50
Marshfield,	-	-	-	14 00	-	-	-	-	-	-	3 25	-	-	-	-
Hingham,	-	-	-	25 00	-	-	$9 00	-	-	-	3 00		132 16	37 00	-
Barnstable,	-	-	-	5 00	-	-	-	-	-	13 00	-	-	132 00	18 00	18 00
Nantucket,	-	-	-	9 00	-	$8 00	-	-	-	-		-	58 00	45 00	45 00
Martha's Vineyard,	-	-	-	14 50	-	-	-	-	-	-	9 40	5 00	70 00	28 90	28 90
Totals,	$120 00	$35 00	-	$1,033 00	$53 00	$8 00	$9 00	-	$30 00	$108 00	$107 40	$55 50	$3,872 41	$1,552 90	$1,500 65

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.—Continued.

FOR FARM STOCK.

SOCIETIES.	For Bulls.	For Milch Cows.	For Heifers.	For Calves.	For Working Oxen.	For Steers.	For Fat Cattle.	For Horses.	For Sheep.]	For Swine.	For Poultry.	All other stock.	Total amount offered for Live Stock.	Total amount awarded for Live Stock.	Total amount paid out for Live Stock.
Massachusetts, . .	-	-	-	-		-	-	$595 00	-	-	-	-	-	-	-
Essex, ...	$15 00	$40 00	$29 00	$6 00	$30 00	$12 00	$23 00	118 00	$14 00	$21 00	$15 00	-	$493 00	$323 00	$312 00
Middlesex, . . .	20 00	87 00	12 00	5 00	28 00	-	21 00	131 00	6 00	56 00	18 00	$55 00*	507 00	439 00	439 00
Middlesex North, . .	35 00	73 00	26 00	-	38 00	20 00	6 00	54 00	27 00	26 00	18 50	3 00	406 00	228 50	132 00
Middlesex South, . .	21 00	18 00	34 00	10 10	11 00	7 00	5 00	101 00	18 00	37 00	36 00	25 00	418 00	323 00	226 75
Worcester, . . .	92 00	155 00	87 00	16 00	59 00	59 00	24 00	608 00	26 00	37 00	21 00	40 00	1,285 00	1,224 00	1,224 00
Worcester West, . .	46 00	56 00	21 00	17 00	34 00	30 00	42 00	494 00	16 00	31 00	6 50	87 00	996 00	868 50	803 50
Worcester North, . .	32 00	59 00	40 00	63 00	38 00	39 00	41 00	229 00	26 00	27 00	14 00	-	815 00	608 00	588 00
Worcester North-West,	4 00	4 00	2 00	2 00	3 00	7 00	6 00	24 00	5 00	-	2 00	15 00†	81 00	74 00	47 67
Worcester South, . .	30 00	33 00	36 00	19 00	54 00	37 00	15 00	63 00	31 50	25 00	6 00	36 00	480 50	385 50	385 50
Worcester South-East,	39 00	40 00	32 00	-	28 00	22 00	12 00	110 00	9 00	42 00	7 50	-	417 00	341 50	272 50
Hampshire, Franklin & Hampden, . . .	51 00	21 00	19 00	22 00	44 00	25 00	62 00	248 00	41 00	16 00	8 00	172 00	729 00	764 00	631 93
Hampshire, . . .	28 00	12 00	10 00	11 00	110 00	15 00	35 00	342 00	23 00	21 00	9 50	20 00	560 00	636 50	514 50
Highland, . . .	17 00	3 00	12 00	4 50	23 00	19 00	26 00	112 00	32 00	8 50	-	-	449 25	268 50	268 50

Hampden,	$64 00	$21 00	$51 00	–	$39 00	$24 00	$30 00	$322 00	$17 00	$19 00	$4 50	$77 00	$1,025 00	$668 50	$550 00
Hampden East,	31 00	19 00	12 00	$5 00	19 00	22 00	14 00	87 00	13 00	14 00	4 75	38 00	377 50	278 75	278 75
Union,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Franklin,	72 00	57 00	11 00	10 00	40 00	44 00	20 00	177 00	102 00	25 00	5 00	61 00	740 50	624 00	578 25
Housatonic,	43 00	71 00	36 00	10 00	63 00	45 00	28 00	568 00	80 00	33 00	27 00	32 00	1,006 00	1,036 00	1,036 00
Berkshire,	42 00	78 00	45 00	12 00	55 00	32 00	14 00	301 00	128 00	46 00	43 00	69 00	1,011 00	865 00	865 00
Hoosac Valley,	24 00	33 00	15 00	6 00	24 00	3 00	17 00	163 00	70 00	13 00	23 00	–	566 00	391 00	390 00
Norfolk,	34 00	65 00	18 00	–	16 80	–	–	163 00	5 00	24 00	20 00	–	608 00	345 80	272 00
Bristol,	58 00	32 00	33 00	4 00	132 50	33 00	51 00	134 00	28 00	33 00	32 75	–	516 00	571 25	571 25
Bristol Central,	50 00	36 00	15 00	5 00	126 00	4 00	33 00	149 00	35 00	45 00	47 50	37 00	603 00	1,482 50	1,482 50
Plymouth,	46 00	94 96	40 96	39 28	33 80	30 00	61 16	728 50	54 00	49 00	64 00	–	1,407 00	1,241 66	1,241 66
Marshfield,	5 00	5 00	9 00	3 00	10 00	5 00	11 00	12 00	5 00	8 00	5 00	–	86 00	84 00	84 00
Hingham,	29 00	72 00	–	17 50	19 75	–	47 25	48 00	80 00	95 50	27 25	–	502 25	436 25	–
Barnstable,	15 00	12 00	10 00	6 00	18 00	6 00	35 00	41 20	20 00	20 00	15 00	–	303 00	198 20	198 20
Nantucket,	22 00	67 50	–	–	14 50	–	10 00	125 00	15 00	14 00	10 00	–	482 00	278 00	278 00
Martha's Vineyard,	25 00	38 00	23 00	5 50	18 00	–	29 00	53 75	39 00	13 00	7 00	6 00	293 50	257 25	257 25
Totals,	$1,010 00	$1,303 46	$678 96	$298 88	$1,129 35	$540 00	$697 41	$6,401 45	$965 50	$799 00	$497 75	$773 00	$17,163 50	$15,245 16	$13,926 71

* Herds of Cattle.

† Town Teams.

Analysis of Premiums and Gratuities Awarded.—Continued.

FOR FARM PRODUCTS.

SOCIETIES.	Indian Corn.	Wheat.	Rye.	Barley.	Oats.	Beans.	Grass Crops.	Grass Seeds.	Potatoes.	Carrots.	Beets.	Parsnips.	English Turnips.	Ruta-Bagas.	Onions.	Other Root Crops.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$10 00	-	-	-	$8 00	-	-	-	-	-	-	-	-	-	-	-
Middlesex,	3 00	$3 00	$1 00	-	-	-	-	-	-	-	-	-	-	-	-	$56 00*
Middlesex North,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Middlesex South,	11 00	8 00	6 00	-	-	-	-	-	-	-	-	-	-	-	-	12 00*
Worcester,	5 00	1 00	2 00	-	1 00	$1 00	-	-	$0 50	$1 0	$1 00	$1 00	$1 00	$1 00	$1 00	19 00
Worcester West,	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
Worcester North,	36 25	33 00	10 00	-	4 00	4 50	-	-	9 00	-	1 25	-	50	-	6 25	3 50
Worcester North-West,	50	-	50	-	-	-	-	-	-	-	-	-	-	-	-	1 50
Worcester South,	1 00	-	-	-	-	-	-	-	2 00	-	-	-	-	-	-	-
Worcester South-East,	-	3 00	-	$5 00	-	-	-	-	-	4 00	-	-	-	4 00	3 00	-
Hamps., Franklin & Hampden,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hampshire,	3 00	12 00	3 00	50	50	-	-	-	3 50	-	-	-	2 00	2 00	1 00	-
Highland,	1 00	-	-	3 00	5 00	-	$3 00	$0 50	10 25	3 00	2 00	-	-	5 00	25	-

Hampden,	-	$18 00	$1 00	-	-	-	-	-	$10 50	$12 00	$0 25	-	-	-	$0 50	-
Hampden East,	$1 75	1 50	1 25	-	-	-	$0 50	-	-	75	50	$1 25	$0 50	$0 75	1 25	-
Union,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Franklin,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 00	$13 75
Housatonic,	62 00	31 00	56 00	$18 00	$38 00	$6 00	16 00	$9 00	31 00	-	-	-	-	-	1 00	-
Berkshire,	36 00	21 00	36 00	15 00	36 00	5 00	12 00	9 00	36 00	6 00	5 00	-	3 00	6 00	-	69 00
Hoosac Valley,	18 00	10 00	7 00	12 00	15 00	-	-	19 00	15 00	5 00	5 00	-	6 00	-	3 00	-
Norfolk,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35 50
Bristol,	36 00	8 00	-	-	-	-	-	-	-	-	-	-	-	-	-	28 50*
Bristol Central,	22 00	8 20	50	-	-	6 00	-	-	7 05	-	-	-	6 00	-	-	-
Plymouth,	-	13 00	7 00	-	7 00	-	-	-	-	-	-	-	7 00	-	-	-
Marshfield,	4 37	-	37	-	-	-	-	-	75	75	75	-	50	-	75	2 00
Hingham,	22 50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barnstable,	21 00	5 00	-	-	5 00	-	-	-	-	4 00	-	-	9 00	-	-	35 05
Nantucket,	8 00	-	-	-	6 00	-	-	-	-	-	2 00	-	-	-	-	-
Martha's Vineyard,	26 00	7 00	-	5 00	12 00	5 00	15 50	-	5 00	6 00	-	-	-	6 00	-	3 00
Totals,	$328 37	$182 70	$137 62	$58 50	$137 50	$27 50	$47 00	$37 50	$128 55	$42 50	$17 75	$2 25	$36 50	$24 75	$23 00	$278 80

* Collection of Roots and Vegetables.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.—Concluded.

FARM PRODUCTS—Concluded.

SOCIETIES.	Total amount offered for Grain and Root Crops.	Total am't awarded for Grain and Root Crops.	Total am't paid for Grain and Root Crops.	Broomcorn Brush.	Fruits.	Flowers.	Any other cultivated Crops.	Milk.	Butter.	Cheese.	Honey.	Wheat Bread.	Rye and Indian Bread.	Corn Bread.	Total amount paid out under the head of Farm Products.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$138 00	$18 00	$18 00	-	$138 00	$46 00	$58 50*	-	$30 00	-	$9 00	-	$11 00	-	$344 35
Middlesex,	73 00	63 00	63 00	-	129 50	21 50	-	-	20 00	-	2 00	$11 00	3 00	-	250 00
Middlesex North,	105 00	67 00	20 00	-	85 50	-	-	-	16 00	-	-	12 00	6 00	-	-
Middlesex South,	141 00	55 50	47 00	-	43 50	14 24	18 50	-	14 00	-	-	21 70†	-	-	71 53
Worcester,	45 00	35 50	35 50	-	3 50	15 00	-	-	23 00	$45 00	-	4 50	3 00	-	129 50
Worcester West,	52 00	-	-	-	21 00	16 00	3 00	-	10 00	51 00	-	6 00	6 00	-	101 25
Worcester North,	178 00	108 25	108 25	-	87 50	20 50	28 50	-	13 50	3 50	3 75	4 50	3 00	-	273 00
Worcester North-West,	4 50	2 50	2 50	-	-	4 50	-	-	3 00	3 00	-	50	50	-	15 00
Worcester South,	50 00	-	-	-	38 00	3 50	-	-	14 00	14 00	25	12 00	6 00	-	90 75
Worcester South-East,	89 00	19 00	16 00	-	93 75	10 25	8 00	-	18 00	7 00	2 75	3 00	3 00	-	140 75
Hamps., Franklin & Hampden,	72 00	17 50	11 50	-	44 25	11 00	17 50	-	10 50	3 00	-	5 00	1 50	$1 50	69 75
Hampshire,	88 00	48 20	46 24	-	41 50	18 25	-	-	10 00	10 00	11 37	3 00	7 50	3 00	140 86
Highland,	84 00	38 00	38 00	-	12 00	1 50	8 75	$3 50	6 50	6 50	1 50	75	50	50	75 00

Hampden,	$318 00	$42 75	$30 25	–	$52 50	$19 00	$31 00	–	$5 00	$1 00	$1 50	$1 50	$2 00	$0 50	$49 25
Hampden East,	95 90	10 00	10 00	–	14 50	4 00	20 75	–	19 00	9 00	5 75	6 75	6 00	–	95 75
Union,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Franklin,	60 50	18 75	16 25	–	66 00	17 00	–	–	10 00	5 50	1 50	4 50	7 00	3 50	121 25
Housatonic,	–	–	–	$3 00	124 00	31 00	48 50	–	36 00	38 00	–	6 00	3 00	3 00	560 50
Berkshire,	300 00	295 00	295 00	–	116 00	17 50	–	–	36 00	44 00	10 00	13 00	5 00	6 00	542 50
Hoosac Valley,	144 00	115 00	115 00	–	66 00	15 00	–	–	10 00	19 00	7 00	5 00	6 00	2 00	245 00
Norfolk,	86 00	35 50	21 00	–	165 00	28 00	–	–	31 00	3 00	–	15 00	5 00	–	179 00
Bristol,	271 00	72 50	72 50	–	116 00	16 50	–	–	29 00	19 00	11 00	4 50	1 25	10 25†	280 00
Bristol Central,	210 00	49 75	49 75	–	57 25	8 25	–	–	14 00	5 00	23 50	3 00	2 50	–	163 25
Plymouth,	175 00	34 00	34 00	–	85 75	51 00	5 00	–	40 00	39 00	1 00	7 50	4 50	–	433 75
Marshfield,	29 00	–	–	–	33 00	5 00	4 00	–	6 00	3 00	50	3 50	–	–	62 24
Hingham,	92 50	22 50	–	–	97 90	16 75	45 40	–	17 00	5 00	6 00	6 00	3 50	–	–
Barnstable,	135 00	79 05	79 05	–	28 00	12 73	–	–	4 00	2 00	–	6 00	7 00	6 00	144 78
Nantucket,	142 00	16 00	16 00	–	42 00	12 25	–	–	19 00	–	–	–	3 00	–	124 25
Martha's Vineyard,	118 00	90 50	90 50	–	45 85	5 75	23 20	–	17 25	6 50	–	4 50	5 00	4 00	202 55
Totals,	$3,299 40	$1,353 75	$1,225 29	$3 00	$1,847 75	$445 97	$320 60	$3 50	$482 75	$342 00	$98 37	$170 70	$111 75	$40 25	$4,905 71

* Collections of Vegetables.

† Sundries.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Concluded.

MISCELLANEOUS.

SOCIETIES.	Amount awarded for Agricultural Implements.	Amount offered for raising forest trees.	Amount awarded and paid out for the same.	Amount for experiments on manures.	Am't awarded for all other objects strictly agricultural not specified above.	Amount awarded for objects other than agricultural.	No. of persons who received premiums and gratuities.
Massachusetts,	–	$1,000 00	–	–	–	–	12
Essex,	$88 00	30 00	–	$40 00	–	$149 50	412
Middlesex,	18 00	–	–	–	–	60 50	198
Middlesex North,	2 00	–	–	–	–	27 00	–
Middlesex South,	27 50	30 00	–	25 00	$8 00	66 95	193
Worcester,	92 50	22 00	–	–	–	15 25	212
Worcester West,	20 00	30 00	–	10 00	–	92 00	180
Worcester North,	51 75	50 00	–	–	24 00	92 62	236
Worcester North-West,	–	–	–	–	–	27 50	67
Worcester South,	3 50	35 00	–	–	7 00	97 45	176
Worcester South-East,	–	30 00	–	–	–	72 09	207
Hampshire, Franklin and Hampden,	11 50	–	–	–	–	40 25	210
Hampshire,	16 25	15 00	–	40 00	–	44 00	190
Highland,	–	–	–	–	3 00	96 00	144
Hampden,	31 00	15 00	–	–	–	57 25	73
Hampden East,	19 50	25 00	–	86 00	–	39 00	75
Union,	–	–	–	–	–	–	9
Franklin,	12 00	10 00	–	–	13 50	47 75	179
Housatonic,	18 00	–	–	–	–	232 00	313
Berkshire,	62 00	–	–	–	–	423 00	475
Hoosac Valley,	–	–	–	–	–	150 50	300
Norfolk,	23 00	15 00	–	–	–	29 00	160
Bristol,	9 00	105 00	$43 00	60 00	–	242 25	378
Bristol Central,	35 00	–	–	–	–	103 00	271
Plymouth,	12 75	60 00	–	60 00	–	220 12	366
Marshfield,	–	–	–	–	–	67 75	218
Hingham,	–	–	–	–	61 00	137 89	650
Barnstable,	3 00	7 00	–	12 00	–	60 63	227
Nantucket,	–	13 00	–	12 00	45 00	63 50	114
Martha's Vineyard,	–	15 00	–	20 00	18 00	109 57	246
Totals,	$556 25	$1,507 00	$43 00	$365 00	$179 50	$2,764 32	6,491

NAMES of the Cities and Towns in which resided the persons when receiving the Premiums and Gratuities awarded by the County Societies, and the several amounts as disbursed.

MASSACHUSETTS.

Brighton,	$200 00
Danvers,	25 00
Dedham,	15 00
Milton,	15 00
Needham,	100 00
Newburyport,	$50 00
Newton,	15 00
Palmer,	150 00
Waltham,	25 00
Total,	$595 00
Also three scholarships, in Cambridge, Hadley and Sunderland,	153 00

ESSEX.

Amesbury,	$5 00
Atkinson,	50
Andover,	14 00
Boston,	40 00
Boxford,	37 50
Bradford,	96 00
Danvers,	122 00
Georgetown,	1 00
Groveland,	32 50
Haverhill,	399 50
Ipswich,	5 50
Lawrence,	20 00
Lynn,	1 50
Lynnfield,	5 00
Marblehead,	$23 00
Methuen,	9 00
Middleton,	14 00
Newbury,	38 00
Newburyport,	24 50
North Andover,	71 00
Rowley,	12 00
Salem,	21 00
South Danvers,	10 50
Topsfield,	23 50
Wenham,	6 00
West Newbury,	41 00
Total,	$1,073 50

MIDDLESEX.

Acton,	$43 00
Arlington,	37 00
Bedford,	13 75
Belmont,	104 00
Billerica,	3 00
Boston,	$8 00
Boxborough,	2 00
Cambridge,	31 00
Carlisle,	6 25
Charlestown,	50

MIDDLESEX—Continued.

Chelmsford,	$7 00	Sherborn	$0 50
Concord,	205 75	Somerville,	17 00
Fitchburg,	3 00	Stow,	26 75
Framingham,	49 50	Sudbury,	5 50
Groton,	3 00	Waltham,	16 50
Hudson,	5 75	Wayland,	20 00
Lexington,	132 25	Westford,	8 00
Lincoln,	46 25	Weston,	3 50
Littleton,	28 00	Winchester,	1 00
Malden,	2 00	Woburn,	31 50
Marlborough,	15 25	Worcester,	1 00
Providence,	4 00	Total,	$881 50

MIDDLESEX NORTH.

Acton,	$8 00	Reading,	$5 00
Billerica,	22 00	Tewksbury,	16 25
Chelmsford,	130 50	Tyngsborough,	94 00
Dunstable,	68 00	Wilmington,	25 00
Dracut,	38 50		
Lowell,	121 50	Total,	$528 75

MIDDLESEX SOUTH.

Ashland,	$13 75	Out of the district,	$12 50
Framingham,	343 08	Sherborn,	10 25
Hopkinton,	19 00	Southborough,	26 25
Holliston,	7 50	Sudbury,	20 68
Marlborough,	12 25	Wayland,	26 81
Natick,	27 55	Total,	$519 62

WORCESTER.

Auburn,	$2 00	Charlton,	$15 00
Barre,	21 00	Dudley,	8 00
Bolton,	15 00	Fitchburg,	111 00
Boylston,	6 00	Grafton,	15 00

WORCESTER—CONTINUED.

Hardwick,	$5 00	Shrewsbury,	$35 25
Holden,	3 50	Southbridge,	14 00
Leominster,	25 00	Spencer,	3 00
Milford,	35 00	Sterling,	50
Millbury,	101 00	Sutton,	222 00
New Braintree,	22 00	Webster,	2 00
Northborough,	5 00	Westborough,	36 00
North Bridgewater,	150 00	West Boylston,	32 50
Northbridge,	1 00	Worcester,	481 75
Oakham,	75	Other towns out of district,	28 50
Oxford,	22 00		
Princeton,	99 00	Total,	$1,517 75

WORCESTER WEST.

Athol,	$4 00	Oakham,	$14 50
Barre,	372 75	Palmer,	55 00
Brimfield,	20 00	Petersham,	1 75
Boston,	11 00	Prescott,	8 00
Brookline,	1 50	Princeton,	27 00
Charlton,	37 00	Sturbridge,	7 00
Fitchburg,	100 00	Sutton,	81 00
Hardwick,	100 00	Templeton,	23 25
Hubbardston,	2 00	Warren,	14 00
Monson,	15 00	Winchester, N. H.,	25 00
New Braintree,	20 25	Worcester,	28 25
North Brookfield,	23 75	Total,	$1,022 00

WORCESTER NORTH.

Ashburnham,	$13 00	Northborough,	$1 00
Ashby,	8 00	Oakdale,	1 00
Boston,	7 00	Princeton,	217 50
Fitchburg,	536 37	Royalston,	6 00
Lancaster,	2 00	Shirley,	14 00
Leominster,	64 25	Sterling,	11 00
Littleton,	8 00	Westminster,	47 50
Lunenburg,	113 75		
New Haven,	1 50	Total,	$1,051 87

WORCESTER NORTH-WEST.

Athol,	$38 25	Phillipston,	$21 66
Fitzwilliam, N. H.,	58	Royalston,	9 00
New Salem,	1 00	Springfield,	2 58
Orange,	2 67		
Petersham,	1 58	Total,	$77 32

WORCESTER SOUTH.

Brimfield,	$40 00	Sturbridge,	$174 45
Brookfield,	16 40	Sutton,	31 00
Charlton,	152 55	Wales,	50
Dudley,	53 00	Warren,	45 90
Holland,	9 00	Webster,	26 90
Millbury,	50	Worcester,	1 00
Southbridge,	99 50		
Spencer,	5 00	Total,	$655 70

WORCESTER SOUTH-EAST.

Bellingham,	$6 50	Providence, R. I.,	$8 00
Blackstone,	11 00	Salem, Oregon,	35
Charlton,	17 00	Southborough,	12 00
Franklin,	4 00	Sutton,	20 00
Grafton,	19 00	Upton,	65 00
Holliston,	31 25	Uxbridge,	15 00
Hopkinton,	88 25	Westborough,	68 00
Medway,	3 12	Wrentham,	3 25
Mendon,	125 00		
Milford,	229 87	Total,	$726 59

HAMPSHIRE, HAMPDEN AND FRANKLIN.

Amherst,	$18 00	Easthampton,	$39 50
Chicopee,	30 00	Granby,	4 00
Cummington,	11 00	Hadley,	60 50
Deerfield,	136 00	Hatfield,	29 50

HAMPSHIRE, HAMPDEN AND FRANKLIN—CONTINUED.

Leverett,	$4 00	Springfield,	$21 00
Northampton,	269 00	Sunderland,	39 00
Plainfield,	19 00	Westhampton,	5 00
Prescott,	3 00	Whately,	4 00
Shelburne,	53 00	Williamsburg,	34 50
South Hadley,	17 00		
Southampton,	26 00	Total,	$823 00

HAMPSHIRE.

Amherst,	$352 65	Pelham,	$29 25
Belchertown,	23 25	Prescott,	4 25
Enfield,	24 00	Shutesbury,	7 00
Chicopee,	12 00	South Deerfield,	25 00
Granby,	9 00	South Hadley,	5 00
Hadley,	62 75	Springfield,	110 00
Leverett,	20 82	Sunderland,	133 05
Monson,	5 00	Westfield,	28 00
Northampton,	1 00	Total,	$852 02

HIGHLAND.

Amherst,	$5 50	Newton Falls,	$0 50
Becket,	71 50	Northampton,	6 00
Chester,	65 75	Peru,	40 75
Dalton,	2 00	Pittsfield,	20 25
Hinsdale,	47 75	Russell,	50
Huntington,	4 50	Southampton,	10 00
Lanesborough,	2 50	Washington,	3 75
Lee,	50	Worthington,	17 50
Middlefield,	144 75		
Montgomery,	3 00	Total,	$447 00

HAMPDEN.

Agawam,	$2 00	Chicopee,	$65 00
Brimfield,	3 50	Holyoke,	13 00

HAMPDEN—CONTINUED.

Longmeadow,	$67 50	West Springfield,	$122 50
Ludlow,	6 00	Wilbraham,	49 00
Springfield,	375 00		
Westfield,	9 00	Total,	$712 50

HAMPDEN EAST.

Belchertown,	$18 75	Monson,	$217 00
Brimfield,	34 00	Palmer,	167 25
Holland,	7 00	Wales,	2 00
Ludlow,	12 00	Total,	$458 00

UNION.

Blandford,	$10 00	Russell,	$3 00
Chester,	3 00		
Otis,	2 00	Total,	$18 00

FRANKLIN.

Ashfield,	$2 50	Montague,	$15 50
Bernardston,	24 00	Northfield,	33 75
Coleraine,	17 50	Orange,	3 00
Conway,	98 50	Out of the county,	6 00
Deerfield,	157 50	Rowe,	6 00
Erving,	7 00	Shelburne,	204 25
Gill,	12 50	Shutesbury,	2 00
Greenfield,	189 50	Sunderland,	40 50
Leverett,	12 00		
Leyden,	11 00	Total,	$843 00

HOUSATONIC.

Adams,	$2 00	Great Barrington,	$399 00
Alford,	53 00	Lee,	114 00
Becket,	11 00	Lenox,	102 50
Egremont,	151 00	Lanesborough,	7 00

HOUSATONIC—CONTINUED.

Monterey,	$44 00	Stockbridge,	$177 50
New Marlborough,	35 50	State of Connecticut,	16 00
Otis,	2 50	State of New York,	13 00
Pittsfield,	5 00	Tyringham,	16 00
Richmond,	4 00	West Stockbridge,	12 00
Sandisfield,	5 00		
Sheffield,	372 00	Total,	$1,542 00

BERKSHIRE.

Becket,	$18 00	Peru,	$13 00
Cheshire,	84 00	Pittsfield,	577 50
Dalton,	68 00	Richmond,	31 00
Glendale,	2 00	Sheffield,	30 00
Great Barrington,	67 50	South Adams,	80 00
Hancock,	20 50	South Williamstown,	21 00
Lanesborough,	233 50	Stockbridge,	135 00
Lee,	128 00	Washington,	2 00
Lenox,	261 00	West Stockbridge,	4 00
Monterey,	3 00	Williamstown,	104 00
New Ashford,	13 50	Windsor,	2 00
North Adams,	124 00		
Otis,	4 00	Total,	$2,026 50

HOOSAC VALLEY.

Cheshire,	$37 25	North Adams,	$252 50
Clarksburg,	6 00	Pittsfield,	1 00
Florida,	16 50	Pownall,	29 00
Hinsdale,	6 00	Stamford,	3 00
Horse Show, three days,	361 50	South Adams,	136 00
Lanesborough,	24 00	Williamstown,	259 50
Lee,	22 00	Windsor,	2 00
Lenox,	30 75	Total,	$1,187 00

NORFOLK.

Boston,	$58 00	Needham,	$143 00
Brookline,	23 00	Quincy,	4 00
Canton,	39 00	Randolph,	1 00
Dedham,	137 50	Roxbury,	76 00
Dorchester,	197 00	Sharon,	11 00
Dover,	36 25	Stoughton,	67 00
Foxborough,	1 00	Walpole,	16 00
Franklin,	1 00	West Roxbury,	140 00
Medfield,	24 50	Weymouth,	57 00
Medway,	6 50	Wrentham,	11 00
Milton,	41 00	Total,	$1,090 75

BRISTOL CENTRAL.

Acushnet,	$59 25	New Bedford,	$390 50
Berkley,	90 25	Norton,	53 00
Dartmouth,	3 25	Plymouth,	10 00
Dighton,	14 75	Raynham,	14 50
Fairhaven,	1 00	Rochester,	10 00
Fall River,	288 50	Somerset,	29 00
Freetown,	55 00	Swanzey,	190 00
Lakeville,	122 75	Taunton,	464 00
Mansfield,	8 00	Westport,	17 50
Middleborough,	6 00		
Myrick's,	13 25	Total,	$1,840 50

PLYMOUTH.

Abington,	$88 00	Hingham,	$3 50
Bridgewater,	622 05	Kingston,	4 60
Carver,	13 00	Lakeville,	21 00
Dartmouth,	1 00	Marion,	10 00
Duxbury,	17 25	Marshfield,	6 00
East Bridgewater,	97 00	Mattapoisett,	50
Halifax,	43 75	Medford,	9 00
Hanson,	1 00	Middleborough,	110 76

PLYMOUTH—CONTINUED.

New Bedford,	$61 50	South Scituate,	$13 00
North Bridgewater,	380 25	Stoughton,	20 00
Plymouth,	40 63	Taunton,	115 00
Plympton,	42 00	Wareham,	5 00
Rochester,	43 75	West Bridgewater,	130 14
Pembroke,	3 00	Total,	$1,902 68

MARSHFIELD.

Abington,	$0 25	Marshfield,	$167 86
Duxbury,	37 91	North Bridgewater,	2 00
East Boston,	6 00	Pembroke,	10 50
Easton,	50	Plymouth,	2 37
Hanover,	25	Scituate,	3 50
Kingston,	2 25	Total,	$233 39

HINGHAM.*

Cohasset,	–	Quincy,	–
Hanover,	–	Scituate,	–
Hingham,	–	Weymouth,	–
Hull,	–		
Marshfield,	–	Total,	–

BARNSTABLE.

Barnstable,	$351 06	Sandwich,	$27 50
Dennis,	15 25	Yarmouth,	23 80
Harwich,	7 00	Total,	$424 61

NANTUCKET.

No towns specified in returns.	Total, $506 75

MARTHA'S VINEYARD.

Chilmark,	$180 00	Tisbury,	$335 25
Edgartown,	91 02	Total,	$606 27

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* No disbursements in returns.

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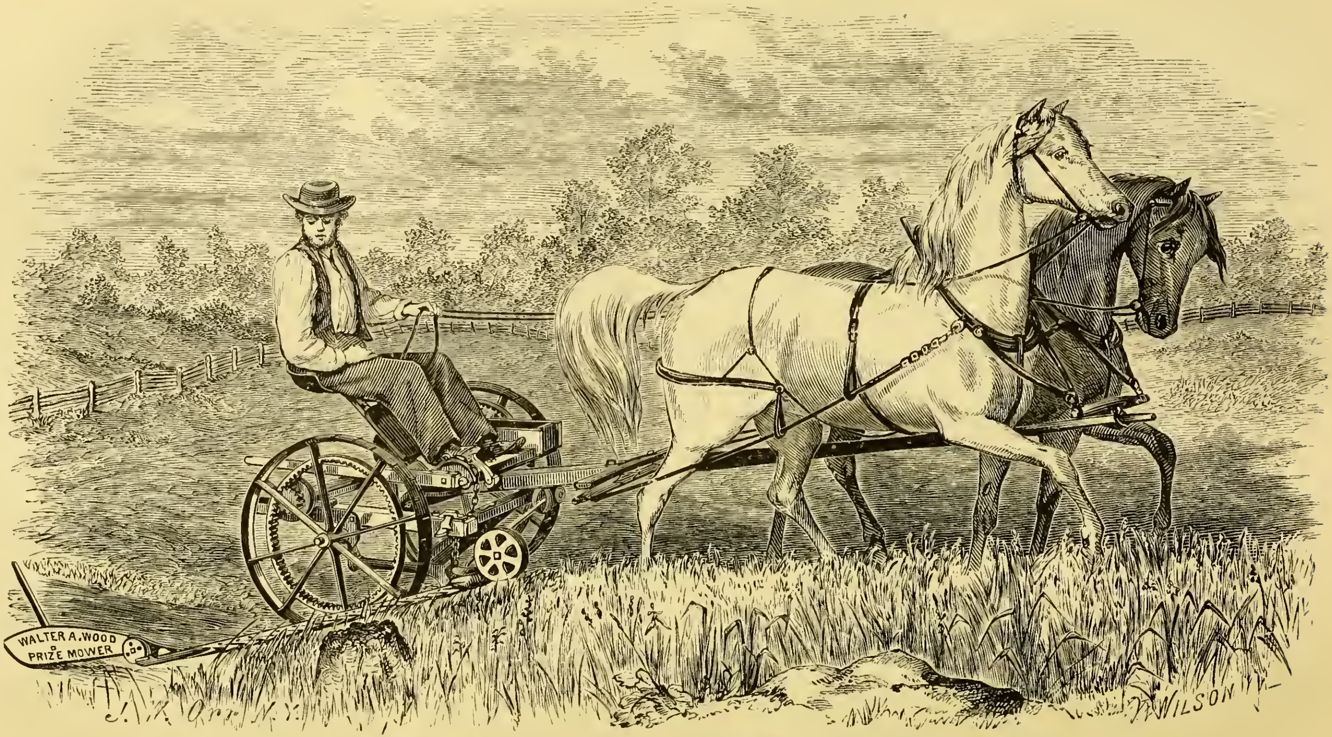
WALTER A. WOOD
PRIZE MOWER
J. W. Orr N. Y.
WILSON

WOOD'S JOINTED-BAR MOWER—passing an obstruction. Grand Gold Medal machine at Paris, 1867. See Report, p. 289.

ABSTRACT OF RETURNS

OF THE

AGRICULTURAL SOCIETIES

OF

MASSACHUSETTS,

1867.

EDITED BY
CHARLES L. FLINT,
SECRETARY OF THE STATE BOARD OF AGRICULTURE.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
No. 4 Spring Lane.
1868.

PREFACE.

I am indebted to the owners of the several animals illustrated in this volume for the loan of cuts, a considerable part of which have been drawn and engraved expressly for use in this Report.

"Aurora 2d," the head of which appears as the Frontispiece of the Report, is red and white. She was calved April 7, 1864. She was got by "Matadore," 5,002—out of imported "Aurora" by "3d Duke of York," (10,166)—"Allspice" by "2d Duke of Northumberland, (3,646,) "Young Amazon" by "Crusader," (934,) "Amazon" by "Sultan," (1,485)—"Bellona" by "Mars," (411)—"Rolla" by "North Star," (458.)

Numbers inclosed thus (—) refer to the English Herd Book, and others to the American.

"Hope 10th," bred and owned by H. G. White, of South Framingham, was calved October 12, 1865. Got by "Monitor," 5,019—out of "Hope" by imported "Usurper," 3,522—imported "Hopeless" by "Horatio," (10,335)—"Lady Elizabeth" by "Earl of Essex," (6,955)—"White Rose" by "Senator," (2,610)—"Red Rose" by "Columella," (904)—by "Shakspeare," (1,429)—by "Blythe Comet," (85)—by "Neswick," (1,266)—by "R. Colling's," son of "Favorite," (1,033.)

The "6th Duke of Thorndale" is considered by many good judges as the best Shorthorn bull in the United States.

The Shorthorn bull "Windsor" is a roan, the property of A. J. Cass, Holliston, Mass. Calved April 19, 1865. Got by "Monitor," 5,019—out of "Windsor Lady" by "2d Hiawatha," 1,660—"Windsor Belle" by Powhattan," 829—"Red Romp" by "Agate 2,"—"Romp" by "Enchanter," (3,729)—"Rachel" by "Washington," (1,566)—"Imported Pansy" by "Blaize," 76—"Primrose" by "Charles," (127)—by "Blythe Comet," (85)—by "Prince," (521)—by "Patriot," (486.)—*American Herd Book, Vol.* 7.

"Monitor," 5,019 (bred by Samuel Thorne,)—got by "2d Duke of Thorndale," 2,788—out of "Acacia" by "2d Grand Duke," (12,961)—"Imported Aurora" by "3d Duke of York," (10,166,) &c.

"Windsor" weighed, at two years old, 1,946 pounds, being at the time in "moderate" condition. He now weighs about 2,300 pounds.

The Jersey bull "Abraham," No. 1 Jersey Herd Book, is owned by the city of Boston, and kept at Deer Island. He is fawn and white; calved in 1863. Dam, "Buttercup 4th;" sire, "Commodore," imported from stock imported by John H. Henshaw, of Brookline, Mass.

"Lady Milton," 136 Jersey Herd Book, is a fawn and white, calved May 24, 1864, owned by James C. Converse, of Arlington. She was bred by J. C. Aldrich, of Milton, from stock from the herds of Mr. Motley and Mr. Henshaw. Her extraordinary yield of butter is given on page 155.

The Ayrshire bull "Honest John," No. —, New Ayrshire Herd Book, bred and owned by William Birnie, of Springfield, is a dark red and white; sire, "John Anderson," No. 33 Ayrshire Herd Book; calved March 20, 1864; dam, "Daisie 4th," No. 46; grand-dam, "Daisie 2d," No. 45; grand grand-dam, "Daisie," imported by Capt. Randall. Sweepstakes at the New England Fair at Brattleboro'.

"Flora," Ayrshire Herd Book, No. 74, owned by William Birnie, dark red and white, calved 1857; bred by George Richmond, Scotland; imported in 1859.

The celebrated stallion "Draco Prince" is owned by John R. Poor, of Somerville, Mass. "Draco Prince" is from Black Hawk and Messenger stock. He is seven years old, sixteen hands high, and weighs 1,080 pounds. His color is black. He has trotted in 2.25½.

My thanks are due also to the inventors and manufacturers of the machines illustrated in the Report, for the use of cuts designed to give some idea of the recent improvements in agricultural mechanics as shown at the various county fairs.

CHARLES L. FLINT.

Boston, January 22, 1868.

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1868.

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AGRICULTURAL EXHIBITIONS.

1868.

Essex, at *Newburyport*,	September 29 and 30.
Middlesex, at *Concord*,	October 1, 2 and 3.
Middlesex North, at *Lowell*,	September 23 and 24.
Middlesex South, at *Framingham*,	September 22 and 23.
Worcester, at *Worcester*,	September 17 and 18.
Worcester West, at *Barre*,	September 24 and 25.
Worcester North, at *Fitchburg*,	September 29 and 30.
Worcester North-West, at *Athol*,	September 15.
Worcester South, at *Sturbridge*,	October 1.
Worcester South-East, at *Milford*,	September 29 and 30.
Hampshire, Franklin and Hampden, at *Northampton*,	October 1 and 2.
Hampshire, at *Amherst*,	September 29 and 30.
Highland, at *Middlefield*,	September 10 and 11.
Hampden, at *Springfield*,	October 6 and 7.
Hampden East, at *Palmer*,	October 13 and 14.
Union, at *Blandford*,	September 16 and 17.
Franklin, at *Greenfield*,	September 24 and 25.
Berkshire, at *Pittsfield*,	October 6, 7 and 8.
Housatonic, at *Great Barrington*,	Sept. 30 and Oct. 1 and 2.
Hoosac Valley, at *North Adams*,	September 22, 23 and 24.
Norfolk, at *Dedham*,	September 17 and 18.
Marshfield, at *Marshfield*,	October 1 and 2.
Bristol, at *Taunton*,	October 6, 7 and 8.
Bristol Central, at *Myrick's*,	September 17 and 18.
Plymouth, at *Bridgewater*,	September 24, 25 and 26.
Hingham, at *Hingham*,	September 29 and 30.
Barnstable, at *Barnstable*,	October 13 and 14.
Nantucket, at *Nantucket*,	September 30 and Oct. 1.
Martha's Vineyard, at *West Tisbury*,	October 20 and 21.

AGRICULTURE OF MASSACHUSETTS.

WHAT TO DO WITH THE FARM.

From an Address before the Essex Agricultural Society.

BY R. H. SEELEY.

The ownership of land in itself is honorable. The retention of a homestead and farm in the possession of a family is one of the most desirable things, whether we consider it as a matter of investment, or of a just and honest pride, as the foundation of a sentiment of family respectability and honor, which successive generations feel themselves bound to maintain, thus proving a safeguard to the children, restraining them from conduct which might disgrace the family name, or sacrifice the cherished inheritance.

Having decided to retain the farm, the question *what to do with it*, returns; and the solution of this question can be reached only by taking into consideration the adaptedness of the farm to this or that purpose, its extent, aspect, soil, and relation to the market.

As it should be worked with a view to profit, the first thing to ascertain is, *what it may be made to produce that is worth raising—that will pay.*

We may safely assume, at the outset, that no man in our good county of Essex can make his farm very profitable who works it on the plan, too frequently pursued, of raising scattering patches of corn, potatoes, rye, oats, beans and grass, on a small scale, and half starved soil; with a large extent of cider orchard, left unmanured and uncultivated, a perfect hotel for caterpillars, borers, canker-worms, and apple-moths; this lean plantation stocked with a few indifferent cows, a pair or two of ordinary oxen, two or three pigs, and a horse of all work, the whole establishment barely supplying the annual consumption by the family through hard work and much economy on the part of all its members.

This style of farming will not prosper in these days, when steam and the iron horse have brought the prairies, with their limitless extent of surface, and unequalled soil (and all for a dollar and a quarter an acre,) within such easy reach of the seaboard.

We must adapt ourselves to the change of circumstances thus introduced, and raise *something that will pay*, on a *scale large enough to pay*, or New England farming will come out "at the little end of the horn."

A farm in our county may be well adapted for dairy purposes, or for sheep raising; it may present facilities for growing root crops, or for market gardening. It may include favorable situations and soils for apples and pears, or for the cultivation of hops, or grapes, and the other small fruits. Any of these products, if the soil and aspect be suitable, and the access to a market easy, can be made profitable *with the right management.* Grazing and dairy farms do pay nobly in New England. There are towns which (without facilities for the sale of milk,) have prospered and become rich by the manufacture of butter and cheese. In certain districts, and under certain conditions, sheep raising is profitable; as the example of Mr. Edwin Hammond, and other Vermont farmers, fairly demonstrates. Market gardening, on the right kind of land, and in the vicinity of a market, pays well. There are instances enough to show that root crops may be remunerative in New England; and, it is worthy of remark, that the cost of transporting such bulky products as these, saves us from the necessity of competing with the West. It has been abundantly proved, also, by experiments in France, that the cultivation of beets for the purpose of making sugar, is not only feasible, but is also profitable to such an extent, that the manufacturers of beet-root sugar ask no protective duties to enable them to compete with the imported sugar which is made from the cane. The time is coming when this matter will be taken up in our Northern States; and when that time arrives, the cultivation of the sugar beet will form an extensive and lucrative department in the business of farming.

I do not know that the soil and climate of New England would prove favorable for the cultivation of hops on a large scale, but judging from the luxuriant growth and fruitage of single vines, here and there, in our neighborhood, the conclusion seems reasonable that the ordinary kind of hops would flourish in our old-fashioned fields, quite as well as another variety of "hop" in our fashionable hotels, and prove much more profitable to those engaged in "getting them up."

Then we have the finer varieties of apples and pears, with the smaller fruits—the strawberry, the raspberry, the blackberry, and the cranberry—most of which require nice management, and some little enterprise to secure success; but which yield most generous returns for the care and expense bestowed upon them. Of apples I need not speak—though I am informed that one of the members of your society has received *four thousand dollars* for his crop of apples in a single year! A few years since, at the counter of the Brevoort House, in New York City, I saw nineteen dollars and the express charges paid for five pecks of pears; and I was not more surprised at the price paid, than at the remark of one of the proprietors of the hotel, that the fruit came from Boston, and that the finest pears and most of the hot-house grapes used in that establishment, were brought from the same city.

Those who are familiar with the facts, (and those who are not should read the charming book, entitled "Ten Acres Enough,") are aware that the cultivation of strawberries, raspberries and blackberries, in large quantities, and in the neighborhood of a large market, is exceedingly profitable, throwing into the shade the gains secured by any of the ordinary farm staples; while of the profits afforded by cranberries I need not speak. And where, we may ask, can a more favorable locality be found for the ready and profitable sale of such fruits than our own county, with its several cities and large manufacturing centres, and withal so conveniently situated in respect to Boston?

I cannot leave this part of my subject without saying a few words concerning *the vineyard cultivation of grapes.*

It is not every farm that presents the right soil and aspect for this purpose; but a person who owns a piece of ground which is well adapted for a vineyard cannot afford to use it for anything else. Experiments are sufficiently numerous to show that, even with the varieties of grapes we already possess, vineyards may be made exceedingly profitable. That of Dr. Underhill, at Croton Point, on the Hudson River, is, probably, one of the most profitable in the country, but it is so largely devoted to the production of wine that it can hardly be referred to as an example. Dr. Underhill has between fifty and sixty acres of vines in bearing at Croton Point, and several additional acres at his farm three miles distant. He employs from ten to thirteen men through the season, and during the vintage ; a number of women also are employed to assist in selecting and packing the fruit for market, and assorting that which is made into wine, so that no unripe berry shall enter the wine press. The exact amount received for the crop of any particular year cannot easily be ascertained, since the wine is not sold until it is four years old. But the statistics are sufficient to show that the profits must be very great. About half of each crop is sold in the New York market, and the other half is converted into wine. The vintage of 1863 gave 5,550 gallons.* In 1864 the product was 6,000 gallons ; in 1865 it amounted to 7,000 gallons ; while in 1866 the total was diminished in consequence of the severe winter of 1865–6.

It must be admitted that the situation of this vineyard is much more favorable than can be secured ordinarily ; and in the vicinity of such a market as that of New York there are advantages which cannot be possessed by every one. But the example is an interesting one on many accounts.

The practicability of cultivating grapes in vineyards, and on a large scale, in our Commonwealth, is demonstrated by Mr. Bull and his enterprising neighbors at Concord. There are in that town more than twenty acres of vineyards. Experiments are also being made in Haverhill, which will furnish additional proof, we doubt not, both of the possibility and the profitableness of this crop. Indeed, we hope ere long to see every suitable spot occupied, and the county of Essex adorned with vineyards, beautiful and remunerative as those which grace the slopes of the Jura, as seen from Lake Geneva.

---

* The pure juice of the grape. We understand that Dr. Underhill does not adulterate his wine with sugar, or water, or alcohol, or any form of drugs.

Mr. Bull, of Concord, to whose experiments and success and intelligent communications on this subject the whole country is under obligations, makes certain statements, (which have been published in the annual reports of the State Board of Agriculture,) to which I would invite your special attention. He states:—

Firstly—That wherever Indian corn will ripen, there the grape will also ripen. (He refers to the Concord grape.)

Secondly—That for field culture in our climate, trenching and heavy manuring are not only unnecessary, but actually injurious; but that a soil cultivated to a sufficient depth, and made sufficiently rich for producing a good crop of corn, is deep enough and rich enough for grapes. Indeed, he claims that, for our climate, the plants should not be set more than six inches deep in the warm and dry soils, nor more than four inches deep in those which are strong and moist.

Thirdly—That it requires no more labor and expense "to take care of" an acre of grapes than to "make" an acre of corn, since the latter implies the necessity of carting on manure, ploughing and successive hoeings, while the grapes need fertilizing with a little plaster of Paris, bone dust and ashes, only once in four or five years, and consequently require less work to keep down the weeds. As to *pruning*, he says: "A little wise neglect is better than a too frequent or too severe application of the knife." "You plough and cultivate as soon as the frost is out, and again in the summer, to keep down the weeds; and you *pinch* the growing shoots two or three times to consolidate the growing wood; this is all the care they need until the crop is ready to gather." Moreover, he affirms that, when planted in rows eight or ten feet apart, and six feet apart in the row, and treated in the manner described, the Concord grape needs no protection in winter; and that "they find at the West that one man can take care of five acres of grapes, and the same thing can be done here."

Fourthly—As to *profits*, Mr. Bull makes the following statements:—

From the records of the agricultural society of Wirtemberg, (in Germany,) which records have been kept for more than four hundred years—about one-half the number have been tolerably favorable seasons for the grape, both as to productiveness and the quality of the vintage.

The average yield of wine throughout Europe is about two hundred and fifty gallons per acre, worth, at twenty-five cents a gallon, sixty-three dollars an acre ; or, for the twelve millions, two hundred and eighty-five thousand and seven hundred and eighty acres under cultivation, somewhat more than seven hundred and seventy-four millions of dollars.

But in this country, where such large quantities of the fruit are sold for the table at good prices, and where the yield per acre is much greater, Mr. Bull claims that the profits greatly surpass those secured in Europe. He states that Col. Husmann, of Missouri, fifty miles of St. Louis, gets nearly nine tons of grapes, and makes a thousand gallons of wine to the acre! This, however, is an extraordinary yield ; for the average product of the vineyards in Missouri is from 250 to 600 gallons of wine to the acre ; and the yield of the Catawba grape, on Kelley's Island, Lake Erie, is only three and a half tons to the acre. Yet Mr. Jode, of Burlington, Iowa, took 8,860 pounds of Concord grapes from half an acre, which had been planted but four years—this being the first crop—while a gentleman in Worcester County, Massachusetts, has gathered crops from his vineyard the value of which has averaged $1,700 to the acre.

Mr. Bull does not think the situation of his own vineyards very favorable, but states that he has raised seven tons per acre, and that last year, which was an unfavorable one for grapes, he gathered five and a half tons per acre, while for seventeen successive years he has not failed to have a good crop. He regards seven tons of the Concord grape per acre as a fair average yield for a vineyard well established, in a favorable aspect, soil, &c., and states that a ready market is secured for the crop at prices which have steadily advanced from ten to twenty cents a pound, while at ten cents the full crop of an acre would amount to $1,400, and at twenty cents to $2,800.

These amounts seem fabulous. Nevertheless, Mr. Bull states, on his own knowledge, that $2,000 per acre was realized in 1865. But let us suppose the average crop to be but three and and a half tons per acre, and the price but ten cents per pound, this gives $700 to the acre.

I visited some of the vineyards in Concord last year, and, on making inquiries as to the matter of profits, I was convinced that Mr. Bull had not overstated the results. A proprietor of one of the small vineyards informed me that his net profits for the preceding three years—one of which had been unfavorable for grapes—had been an average of $996 per acre.

But may not the market be glutted, and the prices be so reduced as not to be remunerative ? This question is discussed by Mr. Bull, and satisfactorily answered in the negative. Moreover, it is worthy of remark that no one apprehends a glut in the market for apples, when planting an orchard of that fruit. The truth is, that, ever since the temptation in Eden, the appearance of good fruit awakens in beholders a desire for it; and it makes a market for itself to such an extent that, taking the average of seasons, it pays well.

As I have referred to the apple as an illustration, permit me to close this long digression with the remark, that *an acre of ground will produce more pure wine than pure cider*, and begin to yield several years earlier ; and that while a first-rate quality of either article can be made only by the exercise of neatness and care, wine may be made as easily as cider, and when made, as it should be, from the right kind of grapes, well ripened, the pure juice needs no water, nor sugar, nor extra ingredients, nor "doctoring" of any sort, to preserve it.

When I contemplate these facts, and see around me so many localities that would be eligible sites for vineyards, used as pastures, lean and poor, or planted with some of the ordinary crops, I am reminded of the Spaniard who lived in poverty and died of starvation on a piece of land that covered a gold mine ; and when I see how slowly these facts attract the attention of our farmers, I cannot but think of the long occupancy of California by the Jesuits and Spaniards, without the suspicion that they were actually in El Dorado, which for centuries had excited the hopes of these adventurers, and where, with simple spade and pickaxe, they might have dug more gold than they had dreamed of in their wildest imaginings.

But let us return to our subject. Not every farm presents the proper aspect and soil for a vineyard, and the most of our cultivators must be content to raise some other products. Consequently, having well considered what crops his farm is best adapted to produce, the matter of *concentrating capital and labor upon it*, is worthy the careful study of each farmer.

The common fault in New England is that of attempting to cover too much surface; to have too great a variety of crops, so that the cultivation is not so neat, so thorough, nor so profitable as it ought to be. I have referred to a style of planting which gives to the fields the appearance of a checker-board, with very small squares, and which, apparently, proceeds on the principle that a large variety, though planted on a thin soil, insufficiently fertilized and half cared for, will make up for heavy manuring, deep ploughing and clean, careful cultivation.

In keeping with this mode of raising the crops, is that method of selling them, which for the sake of getting the retail prices, spends valuable time in taking small quantities to market and peddling them out, frequently occupying a day, which would be worth two dollars if employed in getting out the muck, working it over and spreading it on the farm, in disposing of articles that do not bring more than two dollars in cash. But while we could not approve of such a style of doing things, neither would we recommend ordinary farmers to attempt competition with, or even imitation of, those of their neighbors who pursue expensive methods—methods which look rather to the style than to the profits of farm management. The latter, ordinarily, are gentlemen farmers, who have a prosperous manufactory or mercantile establishment, or a quantity of stock in banks and railroads, on which they can rely for the means, so that in the farm buildings, the laying out of their fields, the fences, the fertilizers employed, the trees planted, the implements and animals with which the farm is stocked, and the hands by which it is worked, little regard is paid to the expense, but the endeavor is to have everything excellent of its kind.

It is very pleasant to have such establishments sprinkled in among the farms of a given district. They furnish striking examples of what may be done in the field, the garden and the stall; and their influence in improving the general style of cultivation and management around them is confessedly very great. Those who can afford to establish and maintain them are or *may* be public benefactors; but our farmers generally must be content to learn what they can from both the successes and the failures of such high farming, and to follow at a respectful distance. They can neither put up such fences and farm buildings, nor go so largely into drainage and irrigation; nor purchase such costly fertilizers; nor own such expensive horses, cattle and sheep. Nevertheless, they can see the importance of concentrating expenses and labor on a smaller extent of land, and in a smaller number of animals. If the same amount of manure and labor will give as much profit on one acre as if spread over two acres, leaving the one acre in better heart, and the two acres more exhausted than when they were taken in hand, then it is manifestly advisable to work half the number of acres in the superior manner; for, in a few years, both the amount of the products and the value of the land would be greatly enhanced. If a man can secure greater returns of cash from an acre of vineyard than from eight acres of corn or potatoes, then the cultivation of the single acre is better than that of the larger number. If the same amount of money expended in five sheep of a particular breed, will give more wool and much better mutton, than if invested in ten of the ordinary lean, thin-woolled, long-legged fence-jumpers, better for his pockets and for the *dispositions of his neighbors* to purchase the five. If a few good cattle, of superior breed and qualities, will furnish more milk and butter or more and better beef than twice their number of "the common run," and if their increase is worth more at three months old, than the progeny of the latter at six months or a year old, then the profits to say nothing of the satisfaction enjoyed by the proprietor would indicate the desirableness of having the better breed of animals.

There are men in Florida whose herds of cattle are numbered by the thousand, and one proprietor, about fifty miles south of Jacksonville, is said to own about forty thousand. But the animals, like all those of that region, are poor little starvelings, scarcely equal to respectable goats; and it is said a dozen of them give not much more than a gallon of milk. This is worse than anything in New England; but we might find, in our own Commonwealth, perhaps, examples as little deserving of commendation. Concentration of capital in animals is evidently as wise as the concentration of expense in the cultivation of a few acres well, rather than spreading it over many acres. The advice of Virgil—"Praise large farms but cultivate a small one,"—is as applicable to our age and country as to Italy in his day.

It is time this matter was pondered by our farmers. The cheapness of land in this country has led to an ambitious mode of extending a superficial tilth over large surfaces, and congregating worthless animals on lean pastures, without proper regard to appearance or to profit. The consequence is a slovenly style of conducting agricultural operations, on the part of many, that is without a parallel in any civilized land. Take a drive in almost any direction, in almost any neighborhood, and behold the numerous orchards festooned with caterpillars' webs, scorched by canker-worms, and dying out from the borers; and see the fields covered with the ox-eye daisy (white weed,) the golden rod, and broad clumps of savin (juniper,) while the road-sides are decorated with Canada thistles, and rendered dangerous by wild parsnips, poisonous sumachs and dog-wood, or disgusting with stagnant pools, and with vermin that seek refuge from the dying orchards in the superior fertility of the highway.

Why do we behold such things? They are the results of attempting too much. The man who tries to work more land than he can properly work, and to keep more animals than he ought to keep, can afford no thought nor time nor expense, for defending himself from the evils to which we have referred. *Clean* farming and a due attention to his road-sides, are as impracticable for him as *thorough* farming.

Now the public has no right to prevent him from impoverishing himself by his mode of management; but it has a right to demand that he shall not make his farm a nuisance to his neighbors—and a nuisance it is if he converts it into a seed-bed and nursery for these plants and insect pests, so that his neighbors are constantly supplied with fresh accessories, no matter how much pains they take to keep their own plantations clear and clean.

I believe it is admitted that the destruction of these evil plants and insects is possible in any given instance. It follows, therefore, that under certain conditions they might all be exterminated. I have therefore thought that it might be expedient to enact laws offering bounties for the clearance of each farm and the highways contiguous thereto, from these pests, for the period of five years, and at the end of that, declaring them public nuisances, which may be abated like any other offence of the same class.

If by some such measure each one should be induced to attempt no more than he can do thoroughly and well, there can be no doubt that the interests of individuals and of the public would be promoted. The results of a well-planned concentration would improve both land and stock, and the gradual extension of operations would mark the increase of wealth, and not as is now too frequently the case, be an advertisement of incapacity and poverty. In this connection, the suggestion may be worth heeding, that *the New England farmer should not expect too large profits from his farm.*

Retired manufacturers and merchants are not a little prone to be impatient with their agricultural investments. In their business heretofore they have been accustomed to quick returns, and if "successful men," they have probably made large profits on short credits. Hence they are tempted to feel a little "grouty" when their farming operations are not attended with like results. But they overlook several considerations. It is manifest, e. g., that outlays for the purpose of display, or for the mere gratification of æsthetic tastes in farming, have in them no tendency to secure profits, while in the warehouse and counting-room, the contrary may be true. In the latter case, the architecture, the furniture and arrangements which attract attention and please the eye, may be a species of advertising, and as such, may pay well. But analogous expedients will not increase the showers or sunshine, or the crops of a farm.

Our gentleman-farmer may also overlook the fact that actual improvements, whether in the quality of the land itself, by manures, drainage or extra cultivation, or in the fences, buildings, implements, and farming conveniences generally, are of the nature of permanent investments, which may add to the intrinsic value of the farm without immediately increasing its profits. If so-called improvements do not add to the intrinsic value of the farm, they surely should not be set down in the account against it. For it is not answerable for the mistakes of its proprietor. If a gentleman puts up shooting-boxes, boat-houses, kiosks, fancy barns, massive walls, with extensive conservatories and flower gardens on his place, and indulges in fancy horses and showy equipages; these must be regarded as so many expenditures for personal gratification; and ought no more to be included in the outlay for which the farm should yield returns, than the amounts which are expended for pictures to be hung in the parlor, and for concert tickets, or in visiting Saratoga, the White Mountains, and the sea-side, should be reckoned as capital invested in business, on which the ledger must show a fair balance of profits.

Moreover (and none know it better than do our business men,) the amount of returns justly to be expected from an investment, depends somewhat on the safety of the latter; if it be perfectly secure, the income may very properly be much smaller than where there is more or less risk. But if this principle be applied to the matter of farming, it will follow that the profits derived from it ought to be smaller than those of most other forms of business in which capital is employed. Nothing can be safer than a well-advised investment in a farm; since the intrinsic value of the land is subject to none of the mutations which affect almost every other form of investment, in the midst of those political and financial crises which sweep over our land like successive tornadoes.

Again, it is worthy of notice that all the returns received from an outlay of capital, are not in the form of money. An expenditure made in one direction may result in honor and influence—as when an aspirant for public favor contributes to an electioneering fund. Made in another direction, the return may be in the form of personal enjoyment—the gratification of taste in the appearance of a splendid equipage or in works of art, as paintings and sculptures or architecture. But why should not the pleasure afforded by the appearance of flocks and herds of fine animals, by the sight of grassy meadows and growing crops, waving harvests and flourishing orchards and purple vineyards; why should not the enjoyment which these things always afford to the lover of nature, be regarded as an important item in reckoning with the farm? I think myself not entirely a stranger to the fascination there is for certain minds in works of art. I am not wanting in those impressions which the artist seeks to awaken, when with a master's hand, he rounds the marble into magic forms of life, or makes the canvas glow with the varied features of the landscape; but were I possessor of a well-situated and well cultivated farm, I know that from the contemplation of its changing aspects—the swale and swell of meadows green, the waving luxuriance of cultivated fields, the thrift of trees and vines, bowing and swaying under their burdens of purple and gold; and the show of animals (sheep, cattle and horses,) browsing on the pastures, or reposing in the grateful shades; I should derive more pleasure than from all the sculptures and pictures that ever crowded palace halls and palace walls.

Finally, we would suggest that each proprietor of a farm should read and think about his calling and his farm. There is, or has been, a senseless prejudice among certain farmers against books and treatises devoted to their calling; a vast deal of "cant," and not a little attempted concealment of mental sluggishness, by an outcry against "book-farmers" and "book-farming." If there is any man or set of men in danger of trusting too entirely to books, and discarding practice in their agricultural operations, then let some one whose methods are faultless, and whose success is great, exhort them to drop the books and follow his example. Till such cases occur we must think that the reading of well-written works on his calling, and devoting much careful thought to the subject, will be necessary to the highest success of every farmer. The truth is, the world is greatly indebted to those who have thought and written upon agriculture, and also to those whose studies have related to the general topic, whether their field has been that of natural history or natural philosophy; whether comparative anatomy, entomology, meteorology, botany or chemistry. The improvements in stock, fruits, crops, implements and methods of farming, are made by men who read and think; and the man who talks most about the superiority of practical farming, is indebted to some "book-farmer" for that which is most valuable in the animals, the crops, the fruits and the implements on his farm, and for the best modes he pursues in working it. Nay, the grain crop and the hay crop of the present season, which have saved the nation from famine, from calamities greater even than those of war, could not have been gathered without the aid of those machines which have been given to the world, by ingenious inventors, i. e., by men who have devoted long and intense thought to these things; and who, seeing the demand, have sought to meet it, and thus to lighten, facilitate and render more profitable the toils of those engaged in cultivating the soil. In saying that the farmer should read and think upon his calling, we only affirm that in common with every other man who pursues a regular vocation, he should thoroughly understand his business in all its details and relations, and should make the most of it and of himself.

It is too late in the day for ignorance to conceal itself behind a false issue on this subject, or to secure honor and success in a pursuit so respectable and so difficult as that of farming. In one of his admirable and instructive Annual Reports, Mr. Secretary Flint quotes the saying of a celebrated painter, who, on being asked what he mixed his colors with to render them so perfect, replied, "I mix them with *brains*." That is the material with which every man should "mix his colors," and the farmer no less than any other man. He should rear and use his animals, fertilize and cultivate his fields, select and dispose of his crops "with brains;" and for these purposes he should use both his own brains and those of other men to as great an extent as possible. Let him, therefore, co-operate in the establishment of farmers' libraries and reading clubs. Let him take and read the best agricultural journals; let him use wisdom in selecting and industry in studying the best works on agricultural chemistry, horse, cattle and sheep raising; on bees, and on grapes and other fruits; also the various writings of practical farmers, gardeners and nurserymen. If he can, let him procure and carefully read the Annual Reports of the Massachusetts State Board of Agriculture, and especially the discussions of that Board. Let him pursue such a course of reading, meanwhile not neglecting his Bible. In other words, let him be a thorough, intelligent New England farmer, and a good, intelligent New England Christian, and he may enjoy as much of Eden here in Essex County, Massachusetts, as any of Adam's race have enjoyed since the gates of Paradise were closed.

AIDS TO FARMING.

From an Address before the Worcester West Society.

BY SIMON BROWN.

Farmers do not generally realize the fact that good tillage is about equal to an application of manure to lands cultivated in an indifferent manner. We must realize the fact that tillage *is* manure; that the literal meaning of the word "manure" is *hand labor*, as well as of a dressing. To enrich the land is to hoe it, to stir the soil, to expose it to the atmosphere, to plough, to harrow, to cultivate, in addition to what we can get from the stalls.

In butter and cheese-making localities the articles of prime importance must always be good pasturage and abundant crops of herdsgrass and redtop hay; but these may be greatly aided by the cultivation of *root crops*, as these form a succulent and nutritious food which gives the animals tone and vigor, and increases their productive power during the season when they are at pasture. The great agricultural prosperity of England is imputed mainly to the cultivation of the turnip.

Among the devices of great practical value, and one of the substantial *helpers* on the farm is the *mowing machine*. You can rely upon it to cut one acre of grass per hour, as an average, whether it be heavy or light, lodged or standing. A good machine, with horses and driver, is equal to six good men in the field. But there are other reasons why we should use this machine. Most farmers grow old too fast. They perform too much hard work in their youth and early manhood. Constant labor that is light and cheerful promotes health and longevity, but overtasking the powers induces disease and abridges human life.

It is often said that mowing machines are economical on *large* farms, but not so on small ones. Is it so? The farmer who has a large estate is presumed to have capital corresponding with his acres. He is *never single-handed and alone.* If sick or disabled he has stout arms to depend upon in his hired men still to cultivate the crops or secure the harvests. If there is, therefore, any class of farmers who can dispense with the mowing machine, and not sensibly feel its absence, it is the *large* farmer.

Such, however, is not the case with the small one. His success centres in his judicious management, aided by his own muscular power. The hard jobs as well as the easy ones, and the duties that incessantly come, late and early, are also his. Perhaps he has passed middle life, and although in good health, his cheek is furrowed and gray hairs sprinkle his temples. He does not feel like cutting his acre before dinner ; stops to whet his scythe oftener than he did twenty years ago, and rests longer in the shade. His mowing machine does not work as it formerly did. He has plenty of *will* but less *power.*

The mowing machine comes to such a farmer as a real blessing. It enables him to keep up with his younger neighbors ; to cut his crops in season and secure them without loss. He is encouraged, because he can go on with his work as successfully as he did in his younger and stronger days.

I have for several years known an elderly farmer who could not divest himself of the idea that *machinery is a plague on the farm.* So he has bent over the scythe until he has acquired a bend in his back that no medicament can cure. This year the pressure was too strong for him. His prejudice gave way—machinery was triumphant ; and he could be seen in the fresh morning under his beautiful trees, feeding the poultry, or slowly following his fine herd of cows on their way to pasture. He is in no hurry ; sits twice as long at the breakfast table as he did last year, and thinks his food tastes better than it did then. He thinks he can earn more in the time he has to bestow upon his stock, and his care of " little things," as he calls them, than he did in the mowing field. Indeed, it seems, he says, as if he had " nothing to do."

The *tedders* and *horse-rakes*, devised and constructed by your own people, stand in the same relation. They are not only *labor-saving*, but they are civilizers as well ; they tend to elevate and refine, and lead the people on and upward in prosperity, because they save human toil and afford opportunity for more intellectual attainments. Among the great variety of machines in use, those of your towns-people stand deservedly high, and ought to be found in the fields of every progressive farmer.

If time permitted, I should be glad to say something of the value of several smaller implements—seed-sowers, wheel-hoes, ploughs, harrows, and something of the enormous cost of the *fences* in our State. In the State of New York their cost has been estimated at $100,000,000, and their annual cost $10,000-000! I should like to speak of the value of *forests*, not only in reference to building materials and fences, but of their influence upon the climate, crops and general health of the people. I could dwell at considerable length upon the imperfect manner of cultivating the soil which prevails; of occupying too much land.; of working that which lies too far from the buildings; and, in some cases, in a want of sympathy in the business of the farm by the women and children of the family.

In the midst of these imperfections, however, great changes for the better have taken place. New ideas are put in practice in breeding and rearing stock; better and more abundant fruits and vegetables have been introduced, and are enjoyed more as sustaining food than as luxuries.

In-doors, as well as out, the genius of our people has introduced into the kitchen, dairy, sewing and wash-rooms, so many *labor-saving* helps that women have derived as many benefits from them in their domestic duties as men have in their out-door labors. The sewing, washing and wringing machines, crimping-irons, mangle for ironing, button-hole cutters, apple-parers, cheese-pressers, churns, butter-workers, &c., are civilizers, because they avert human toil and leave the mind free to engage in other pursuits.

The *sewing-machine* came to the never-ceasing work of women as a boon from Heaven. It has taken an inexpressible burden from thousands of mothers, whose harassing duties excluded them from society, denied them access to books and opportunities for the cultivation of those graces which adorn them the most. In the late war our vast armies could scarcely have been clothed without its aid.

The contrasts which I have attempted show great changes in farm life, *in the house* as well as in the field. Another change has been wrought equally important. It has taken place *in the public mind* in regard to the *respectability* and *dignity* of the employment. All useful labor is honorable. "'Tis no sin for a man to labor in his vocation." The educated farmer is qualified to take an active part in the political affairs of life. Not long since the heroic and upright reformer, John Bright, in the British House of Commons, fearlessly denounced the English aristocracy and nobility as of all others the most incapable of being intrusted with the duties and responsibilities of government, no portion of which, said he, *can they manage with common ability*. Educated farmers are the right men to be elevated to stations of official trust and honor, because they have gained experience from their practical management of the common affairs of life. I decry no profession. All useful labor is honorable. We are parts of the great whole, and essential to each other. My plea is, that none shall be elevated at the expense of another.

All reflecting persons admit the *importance* of our profession,—that it is the basis of all prosperity; commerce, manufactures, the arts, power, wealth,—that the cultivation of the soil leads people out of an aboriginal condition and gradually civilizes man,—establishes family relations, builds up society and creates a desire for the higher cultivation of our moral and mental powers.

Several things have conspired to awaken a new regard for rural employments, but especially so the attention which the *press* has given it, the institution of farmers' clubs, and such associations as you are celebrating to-day. It only remains for the farmer to improve his *mind* as well as his soil to place him in the positions he ought to share with his fellow-men, and lead the country to look to him for a fair proportion of its statesmen and leading men. In order to do this, he must understand the *principles* of free government, be a fair scholar in the branches of education usually taught in our high schools, be able to write readily on the topics in which he is interested, make his own reports to agricultural societies, and embody his experiments or opinions for publication. He must remember Rousseau's maxim, that "it requires a great deal of philosophy to *observe once* what may be seen every day." He must be a daily reader of a good newspaper, keep a general knowledge of the progress of State and national legislation, and of current political events, and then he is qualified to become a *good farmer* and a *good citizen.* This is what your association is attempting to do.

Let him remember that "he who makes agriculture not merely productive but honorable; who surrounds his farm with images of the most attractive happiness; who dwells in a neat abode, such as a republican might build and republican simplicity ought to desire; who, in addition to the song of the robin, can make the music of *contentment* flow around his calm dwelling; can unite it with the intelligence of a citizen who knows his rights, and is determined to defend them; who shows that *this business* is favorable to mental culture, and as fair a road as any to political eminence;—such a man does more to encourage the profession than all other causes combined. He touches the springs of action in their centre, and blesses his country and mankind. He plants the laurel beside the plough, and allures thousands to come; and, after having toiled within its fragrance, to sit beneath its shade."

And now, if I have excited you to consider more carefully the enviable position which you occupy as cultivators of the soil; your exemption from corroding mercantile responsibilities and cares; your freedom from the surging slough of political turmoil, and from the risks and losses which attend the manufacturing portion of our population, I shall have gained the point at which I aimed.

If a word has been said to induce you to temper the labor and recreation of your children so as to make the young life harmonious and healthful, or to induce them to regard the paternal *home* as the spot on earth where the most cherished feelings of the heart are clustered, and to which the memory will fondly return through all the later years of life, then, indeed, will my labor be abundantly blest.

To accomplish this let me invoke all who hear me, and especially the gentler sex, upon whom our domestic felicities so greatly depend, to

"Make home beautiful—gather the roses
That hoard up the sunshine with exquisite art;
Perchance they may pour, as your dread darkness closes,
That soft summer sunshine down into your heart;

If you can do so, O make it an Eden
Of beauty and gladness—remember 'tis wise;
'Twill teach you to long for that home you are needing,
The heaven of beauty beyond the blue skies.

Make home a hive, where all beautiful feelings
Cluster like bees, and their honey dew bring;
Make it a temple of holy revealings,
And Love its bright angel, with 'shadowy wing;'
There shall it be when afar on life's billow,
Wherever your tempest-toss'd children are flung,
They will long for the shades of the home weeping willow,
And sing the sweet songs which their mother had sung."

Make home beautiful. Surround it with all that is appropriate in the floral world, with trees and fruits and flowers. Fill it with books and music and healthful recreations. Then will it become the centre of interest to the *young*,—will bind them to the old roof-tree as with hooks of steel, once more to gladden your fields with the labor of your own kindred, and the cherished spot to which each wanderer will return with increased love and affection.

FARMING AS A BUSINESS.

From an Address before the Worcester North Society.

BY GEORGE E. TOWNE.

The distinctive feature of agriculture is the multiplication of of products by subjecting them to the action of natural causes. This is true of the production of field crops. The farmer is also a manufacturer, to the extent of his butter, cheese, *cider*, curing of hay and general preservation of his crops. Indeed, it seems to me that really scientific farming requires a knowledge of more things than does any other branch of business. Mineralogy, so far as is concerned the nature and treatment of soils; chemistry, at least the simpler forms of chemical action and combination governing the laws of growth; botany, at least the botanical structure of the plants he wishes to grow; the habits, wants and diseases of all kinds of domestic animals; a little about insects, and a good deal about getting rid of them, are but a few of the forms of knowledge essential to the farmer. I do not say that all farmers know all these things; I only say they ought to. Something very like instinct, convictions born of observation, precedent and necessity, and developed, it must be confessed, to a condition of remarkable accuracy and correctness, have generally supplied the place of science to the farmer, and served as his guide to action. But I am speaking in the belief that, as in mechanics, so in farming, the day of estimates, guesswork, allowances and "working by the eye," has gone, or is going by, and in place of these, scientific rules, based upon known principles, are to govern and lead to precision and absolute certainty of results.

Besides these features in farming, there is one important difference between it and most other kinds of business. While with the manufacturer and the merchant, home and all the expenses of living are usually entirely separate from the business, and easily kept so, with the farmer, home and its expenses are so closely united and blended with the farm and the business, and so many of the products of the latter enter directly into the consumption of the former, without passing, as in the other case, through the intermediate stage of bank bills, which are easily kept account of, that entire accuracy of accounts, to show the exact product or result of the year's or quarter's operations, is rendered extremely difficult.

Here again, you will likely say, what difference does it make? Why not let expenses and income all go right in together, and if there is anything left at the end of the year, call it profit? Simply because, while income and expense should bear a certain relation to each other, they are two separate and distinct things, and should be kept so, to the end that the amount of each may be always ascertainable. For instance, if the two are jumbled up together, and no record kept of either, who can tell if a possible deficiency is due to the diminutiveness of one, or extravagance in the other. I submit that as often at least as once in each year, every business man should, by careful inventory and estimate of value, ascertain the exact result of the year's operations. The value of the business and the feasibility of continuing it, depend entirely upon the amount of income arising from it, and this cannot be determined, unless expenses are kept by themselves and entirely separate. I may be wrong when I say that perhaps not one in ten among farmers ever takes a regular account of stock, while nine out of ten merchants and manufacturers do it annually as a matter of course. I may at any rate safely assert that it is as uncommon in the one class as it is common in the other. Now why is this? Is there necessity existing in the one case and not in the other? Is it not as important for the farmer as for the manufacturer, to know if he is making or losing money?

The manufacturer not only makes it his constant study to know the cost of his various products, but at least once in each year verifies his estimates of cost, by ascertaining actual results. He is thus enabled to control his losses, and make his gains larger, by reducing or increasing his business, in this or that direction, according as he may find this or that article among his products, more or less profitable. Is there any earthly reason why the farmer should not follow this example? Yet I am much mistaken if he does to any great extent. The manufacturer, when he sends his cloth to market, knows within a fraction of a cent per yard, what it has cost him; he thus knows at just what price he can afford to sell it. The farmer goes with a load of hay, apples, potatoes or wood, and, *possibly*, guesses they cost about so much—*probably* he neither knows, thinks or cares anything about it. He sells it for what he can get, and never knows how much that particular article contributed to, or possibly diminished, his yearly gains.

I recollect a discussion, at one of our society meetings, upon the question of the profitableness of raising corn. One of the most intelligent farmers of Worcester North, and one, from his experience in that direction, best fitted to tell all about it, rose to the defence of King Corn. The best thing that he could find to say was, in effect, that he had raised corn for many years; had produced so many bushels to the acre; had developed a new and choice variety, and had generally thriven; and he should continue to raise corn, as he had no doubt many of his brother farmers would, unless they could be shown something better to do.

All very well, but not convincing, as the question would arise in my mind, whether he had thriven by the aid of corn, or in spite of it. The fact was, that he, like others, raised corn with the other crops, and they all went in together; and so long as at the end of the year there was seemingly a balance on the right side, all was satisfactory. I doubt if in any other business but farming that same gentleman would have been satisfied, unless he knew not only his aggregate annual gains, but the exact proportion which each of his products had contributed towards the result.

Let us now invest an imaginary farmer, with a farm equally so, and hastily follow him along, and apply the rules and principles we have tried to enunciate. We will be generous with him, and give him a good farm, well stocked, and money enough to carry it on easily and well. He first divides his farm into sections, numbering or naming his wood-lots, fields, pastures and dwelling-house and lot, for convenience sake. He then estimates the value of each, fixing the same proportionate to the whole. He opens an account with each one, charging to each its valuation. He also opens an account with his barn, his stock, his vehicles and tools, charging to each its value. He must, of course, keep a cash account, and charge or credit to some one of his various accounts every cent he pays out or receives.

He charges to each field expenditures for seed, manure and labor, for share of tool account, and each day's work of himself or his oxen for planting, cultivating and harvesting. If he sells his crop, he credits the cash received. If he stores it for family use, or to feed to his animals, he charges it to family expense, or to the barn account, at whatever he could have sold it for. After the crop is cleared he estimates the value of the field, making allowance for whatever gain or loss in its condition and crop-bearing capacity may have occurred since the previous valuation, and the balance of the account shows what has been made or lost from that section of his farm.

His wood-lot he treats in the same manner. Starting with the cost valuation, he charges the expense of clearing, thinning out, cutting and hauling, even though he does it himself, and credits all cash received for sales of wood or timber, and all wood cut for his own family use, which he charges to family expense account at the current rate. True, this is merely taking from one pocket and putting into another; but he is desirous of ascertaining the exact cost of every product, and if there be aggregate gain or loss, where it comes from or goes to. Accordingly he treats, for instance, wood taken for his own use, so far as the wood-lot is concerned, precisely as though he had sold it to somebody else; so far as family expense account goes, just as if he had bought it of somebody else. At the close of the year he credits the value of the wood-lot, making due allowance for wood cut, on the one hand, and the growth on the other; and the balance of the account is the gain or loss, as the case may be, arising from that portion of his farm.

The barn account is charged with valuation and with everything that goes into it—hay, grain, straw, &c.,—at what it is worth at the time of delivery, just as though it had been sold; with all labor, taking care of stock, &c., and all repairs upon buildings, even though done with his own hands. It is credited with all sales of produce made from it, with manure sold or delivered to various parts of the farm, (which latter is at the same time charged to various sections or fields at a fair current price,) and with the valuation of the barn and contents at the close of the fiscal year, which should be about the 1st of March. The balance of this account, of course, would represent the net cost of whatever the animals had consumed, and should be charged to their account.

The reason for charging the valuation at the commencement of the year, and crediting it at the close, is to show in the account the depreciation and repairs. For instance, a barn is valued at first at $1,000. It needs repairing, and you expend $250 in shingling, &c. It is hardly fair to charge the whole of this to the repairs for the year of its payment, as the barn is worth more for the expenditure. By charging first the original value, $1,000, then the repairs, $250, and at the close of the year crediting a fair valuation, which, under all the circumstances, improved as it is by the repairs, may be properly called, say $1,200, you have a balance of $50, which very nearly represents the depreciation and wear of the building.

The stock account should be charged with the value of the animals at the outset, and with cash paid for additions and for food, with balance of barn account, as shown previously, and credited with sales of animals, milk or meat, with milk and meat consumed by the family, with labor performed by the teams, either for others or for the different sections of the farm, to which it is to be charged as shown, and finally with a fairly estimated valuation of stock on hand at close of year. The balance shows the gain or loss arising from the keeping of stock. The value of such an account would be something surprising. For instance, a simple calculation and sifting of the details would show the exact cost of feeding or rearing any animal.

Vehicles and tools should be charged with valuation at outset, with repairs and renewals, including cash actually paid and labor performed by the farmer himself, or his men, and credited with value at end of year. The balance would show cost of use of tools and vehicles, which should be properly divided up and charged off to the various sections of the farm. The homestead and lot should be charged with valuation, with interest, and its share of taxes and insurance (as indeed should every other section of the farm,) with repairs and labor expended, and credited with valuation at close of year. The balance would show the cost of rent, properly chargeable to family expenses.

Family expense account should be charged with valuation of furniture, with cash paid during the year for additions to the same, with balance of homestead account, representing the rent, with all expenditures for food, clothing and the supply of all the miscellaneous wants of the family, and with everything produced upon the farm, which is consumed by them, estimating as nearly as may be, in cases where entire accuracy cannot be attained, and credited at close of year, with valuation of furniture, increased as it may be by additions, or diminished by breakage, wear and depreciation. The balance of this account, would show the exact expense of living, for the year.

Here then you have, very roughly sketched, a system of accounts for a farmer. The balances of his various accounts taken in detail, show just where he has made or lost money, and if the same or similar results follow the operations of successive years, he is thereby warned, and can profit by the experience. From these accounts he can calculate with unerring certainty, the exact cost of everything produced, including even interest, taxes, and repairs of tools. He has the entire business tabularized, and can at his leisure during winter evenings, march his columns in review before him and study to some purpose, to reduce costs and save expenses.

Of course the first thought that arises in reference to all this, is that it is too complicated, and thoughts perhaps not complimentary to the speaker, will flit through your minds, to the effect that it is absurd to expect the farmer, at the close of a hot day's hard work, to devote the necessary time to bookkeeping; and I fancy I can trace on the countenances of some, evidence of a feeling near akin to this: that it is well to talk about having plenty of capital, but how is one to get it, if he does not happen to have it; and another, moved by the holy horror of being in debt, which almost universally actuates the New England farmer, repudiates any system or plan for improvement, which includes that among its possibilities.

Well, I cannot wonder at this, as new ideas, urged upon the consideration of any class of men, by one confessedly not practically acquainted with the details of their calling, might naturally be received by them with suspicion; but bear in mind, that if these suggestions seem new and untried, they are only so in their application to farming. They constitute the chart by which every man engaged in every other business steers his course; and in the very considerable thought I have given to the subject, I fail to see wherein you differ essentially from other business men, or why the system and method, found to be necessary to success in other branches of business, are not equally so in farming.

You may not, but I do, believe that a system of accounts similar to what I have suggested, would save to the farmer ten times the trouble and time of keeping them, by showing him just where he makes, and how he loses money, thus enabling him to save the days of drudgery and exhausting toil, expended upon crops which hardly return a new dollar for an old one. Perhaps I have elaborated too much, and suggested classification to an extent greater than would be found desirable; but I believe, to use a homely phrase, that every tub should stand upon its own bottom; and that if a farmer does not make as much money as he thinks he ought, he should be able to trace the loss to its proper locality, and let corn, fruit, hay, animals, or family expense bear the burden which belongs to each.

Without the accounts he can only "kinder guess" that he did not cut so much hay as usual, or it didn't seem to go so far, or his cattle didn't sell well, or his labor cost too much. Now would it not be much more satisfactory to the farmer, to be able to turn to actual results expressed in figures, and by reference to account with field No. 10 for instance, find that it cut so many tons of hay by actual weight, or estimate sufficiently accurate worth so many dollars per ton and that it actually cost —including interest and taxes, labor, depreciation of productive capacity by the exhaustion of manure &c.,—so much money, showing for field No. 10 a good fair profit. He then turns to the stock account, and finds that part of his loss occurred there, by the low price of beef perhaps; ("this is writ sarcastical, A. W.") and he takes courage, as he reflects that it probably will not occur again (and it doesn't,) and he looks further, and finds that his family expenses have been large; that after reckoning the interest and taxes and insurance on his house, his rent is pretty heavy, and that on the whole his farm paid a fair income, but that his expenses have eaten up too large a share of it, and then he studies expense account, to see if retrenchment can be effected there; and possibly he fancies that his wife might get along with one less bonnet or shawl or dress, and if he is a bold man he holds a consultation with her upon the subject, and probably retires from the interview, musing deeply upon human weakness, and liability to error.

So much for the idea of a system of accounts in farming; and now let us briefly consider the question of capital. What is a farmer to do, who has not got it of his own, and cannot or does not dare to borrow it? Well, this is a fair question, and deserves an answer equally so. You shall have it. He must farm at a great disadvantage all his life, or until he acquires it, as compared with one who has it. Is this hard and discouraging?

If it seems so, recollect if you please, that no one is to blame. It is true, and we are bound to state facts as we find them. Farming in this particular, does not differ essentially from any other business. Here at least, the conditions are the same; and if it seems discouraging to a young man just starting in life, to be told that capital is essential to success, let him bear in mind, that it is not so in farming only. What would you think of a man who should hire a store, and buy on credit a large stock of goods, and start a large business, without any capital? You say at once he would fail, and whether you say so or not, he would. There would hardly be one chance in a thousand for him, and when the crash came, the unanimity with which the community would decide that he was a fool, if not something worse, would be such as is seldom seen outside of a political caucus or a parish sewing circle.

Is it then reasonable to expect that a young man can buy a farm and stock it and carry it on without money? Is there any guardian angel who presides over the destinies of agriculturists and exempts them from the common lot of humanity? Are they not subject to the same laws, based upon principles as simple and immutable as that two and two make four, that govern other business men? Let us see. A young man buys a farm, and owes for the whole of it, agreeing to pay interest, and a certain share of the principal each year. He perhaps has money enough barely to stock it. The farm is in good condition and produces for him full crops, but he has his family expenses to provide for, and his payments, and these must all come out of his products. He tugs and sweats and studies to save, but his want of money is ever pressing. He is obliged to sell a portion of his hay to raise money. Then he reduces his cattle in number, to make up further possible deficiencies, and because he has not hay for them, and perhaps finally makes up in full the needed sum, by selling wood and timber which is growing and increasing rapidly in value.

In the spring he finds he has lived through the year and met his payments, but he also finds that selling his hay, stock and growing timber, was equivalent to paying a ruinous rate of interest for his money. He finds that could he have retained his hay and cattle and converted the former into beef and milk, he would have netted nearly twice as much for it, as he actually received and he would have had besides, a plentiful stock of manure, with which to keep up the productive capacity of his farm. He also estimates that the rapidly growing timber, cut to meet his payments, would have nearly doubled its value in three years. Thus his second year is started, with the same thing to be done again which so severely taxed his resources, and under circumstances not as favorable as at first; and so on; there is no need to follow him further. The story of his toils, his struggles, his privations, are better known possibly to many of you than to me. For there are very few New England farmers whose lives have not been a realization of the same story told over and over again, of hard work and severe economy and labor but poorly requited. Insufficient capital is very largely at the bottom of this. A pressing need of money, too often chronic, and a consequent necessity for skinning the farm to raise it, tells the sad story of impoverished lands and diminished products.

A word here, explanatory of a seeming inconsistency, may not be amiss. I have advised borrowing capital in preference to going without it; and it may be said that owing for one's farm is but borrowing capital. This is true; but a debt for money borrowed permanently—that is, with no immediate necessity for paying the principal or any part of it, so long as the interest is duly cared for, is a very different thing from the mere temporary indebtedness of one who buys a farm or merchandise, agreeing to pay at a fixed time, or contracts to pay at stated periods. If the farmer owes money permanently, he has only the interest to care for, and the business ought to earn and enable him to pay it easily. If it does not do this, it is not worth pursuing. If it does, the payment will not embarrass him, and thus, comparatively at his ease, he lays broad and deep the foundations for a productive farm, which, in later years, will enable him easily to pay his debts and own his capital. In the case we have cited, it was not the payment of interest, but of a portion of the principal, which compelled, by premature sales of hay, stock and timber, the virtual payment of from twenty-five to fifty per cent. for the raising and use of money. Still, you will say, it is hard and discouraging, if true, that success in farming depends upon possession of capital. I grant it, but must still adhere to my proposition—that the full measure of success is not to be accorded to him who starts any business without the absolute command, (either by owning or permanently borrowing,) of sufficient capital. But is there no remedy ? Most assuredly ; and here we are brought face to face, with what seems a great mistake in the education and training of our young men, and an idea developed thereby, which has done and is doing great mischief in their minds.

The error is in trying to make mature men of them too early, and the false idea thus developed, is that they must do or try to do everything that full-grown men attempt. In accordance with this idea, they must commence business on their own account at the earliest dawn of manhood, and be ready to retire and enjoy themselves in entire freedom from care before they are forty. Too often they recover from their delusion to find themselves bankrupt at thirty. It might afford an instructive lesson to such, could we ascertain by careful inquiry what proportion of men who find themselves rich at sixty were even "square with the world" at thirty. I may be mistaken, but I have an impression that very little of the property owned by men is acquired during the decade succeeding their majority. A large proportion of successful men either engage in business for themselves after they are thirty, or are forced to build up success upon the ruins of a failure, and in either case profit by their experience.

And most assuredly is it the best policy to make haste slowly, when delay may bring capital, in the form of accumulated earnings. The demand for skilled and intelligent labor is and must be for years to come, in our growing country, in excess of the supply; and the first few years of early manhood cannot be regarded as mis-spent, nor can the labor crowded into them be as hard, or the anxiety of life so wearing, if given to that mechanical employment which most naturally and easily promises a fair return, as would surely be the case, if, in the haste to embark on his own account, the over-zealous young man were to plunge into farming or other business, destitute alike of experience and capital.

I might dwell upon these topics almost indefinitely, for they are directly in the channel in which the thoughts of a business man most naturally run ; but, alas! there is a limit even to the patience of a farmer, and there must be a corresponding one to an agricultural address. The suggestions which have been made are such as have seemed to me best calculated to serve the farmer and lighten his cares and toil. They have been applied and their value tested in all directions, save perhaps in farming ; and I can see no reason why system and accuracy are not equally applicable to that as to other branches of business.

Agriculture is the most important interest in the world, because it is the basis upon which all others rest. Ask a shrewd merchant as to the prospects of business in days to come, and he points to the crop reports for his reply. Improvement and progress in agriculture, then, is improvement and progress in all directions; and it really seems that it is or would be a long stride forward in the direction of progress, at least, could the farmer, by the introduction of the system and method which, in other branches of business are found indispensable to success, but which in farming are, to say the least, not common, be enabled to see and know that labor, which in this direction means success and rich returns, in that is utterly wasted and thrown away or worse.

Complaint is often made that the boys leave the farm ; that other modes of life have greater attraction for them. I doubt not that it is so, and I know it will continue to be so, till you reverse the conditions and make the attractions of a farm life greater than can be found elsewhere. This you can only do by giving the brains more and the hands less to do. We live in an age of thought, and we must not expect, after lavishing money upon the schools and colleges, to which we send our boys to learn things their fathers never dreamed of, that they will be satisfied to be fitted to the old time grooves, to accept convictions a half century old, or to settle down contentedly to the raising of a dull routine of crops in regular rotation, and for no particular reason, save that their fathers and grandfathers did the same before them.

It seems to me that the discovery and application of steam to locomotion and transportation has imparted to the age something of its own fastness and rapidity, and that even as the employment of this tremendous agent in mechanics has revolutionized all mechanism, so the swiftness which it has somehow imparted as a characteristic feature to the age, has rendered necessary to the farmer, as to others, new modes of thinking and acting, new methods and new manners.

I believe that the New England farmer of the future must be a very different man from the New England farmer of the past, in order to do the work that the future calls for, as well as it has been done in the past; that the keen, shrewd, hard-working man of instinct, guess and observation must give way to the man of system, science and exact knowledge; that in short, agriculture in the near future is to be conducted upon the same principles, and governed by the same rules which underlie and control all other business interests. Pardon me, if, in this belief, and actuated by a desire to be of such use as I might, in speeding a change which seems to me inevitable and necessary, I have seemed too freely to offer advice and suggestions to men of capacity and intelligence, fully equal, if not superior to my own.

ELEMENTS OF SUCCESS.

From an Address before the Union Agricultural Society.

BY C. O. PERKINS.

Massachusetts is a manufacturing State. There are only one-fourth as many persons engaged in agriculture as in manufacturing. With a population of 1,267,000, not less than 217,500 are engaged in manufacturing, and only 68,600 engaged in agriculture. Consequently, manufacturing is the leading, and farming the secondary, occupation of the people of Massachusetts; and we see more of the manufacturing element in our communities than of the farming, and we are dazzled by the display of the few manufacturers who are making large income returns, dress expensively, and drive fast horses. But, farmers, think for a moment of the hard toil of hundreds whose real wants are inadequately supplied, whose toiling hands add to the luxury of those few. We see the display of the few but not the wants of the many. Does the fact that we are in a manufacturing State need to make us dissatisfied with our lot? There is no State, no country, no nation on earth, where labor receives so great a reward as in our own State. There may be more uniformity in the West, where farming is the leading occupation; there may be more equality there; but labor does not net as good nor as sure returns. With them increase of population does not increase prices of produce, but rather the reverse, because it increases producers. But the increase of population in a manufacturing community increases prices of produce. Every new factory lays additional claims upon the farmer for produce, and while we cannot get the same number of bushels for the same labor that they get at the West, our access to market enables us to get the full price without sacrificing the profits to the carrying trade.

In 1838 the annual industrial products of Massachusetts were valued at $86,000,000 ; in 1845, $124,000,000 ; in 1855, $295,000,000 ; and in 1865 they had swelled to the enormous sum of $517,000,000 ; which give an annual income of over $400 for each individual person in the State. And I find, by comparison of statistics, that the amount per individual of those engaged in agriculture, and those in manufacturing, to be very nearly equal in the aggregate, but may be more evenly divided among the manufacturers than among the farmers.

As I remarked, the entire industrial products of Massachusetts in 1838 were valued at $86,000,000. Now our agricultural products alone, in 1865, were valued at over $92,000,000, which is $6,000,000 more in value than all the industrial earnings of the State were less than thirty years ago. All this rapid increase of material interest is encouraging to the farmer. It adds to the value of everything he produces. His surplus produce finds ready sale at the highest prices and in a home market. In remote markets the manufacturer has greatly the advantage over the farmer. His articles are of more value and less bulk. Take the farmer West, who wishes to purchase a suit of clothes made here. Suppose the suit to cost fifty dollars. The transportation from here to Chicago on that suit might be fifty cents, or one one-hundredth part of the first cost, to be paid for in corn, worth one dollar a bushel here, making fifty bushels, which, at the rate of two dollars freight for twenty thousand pounds, would make the transportation twenty-five dollars, or one hundred per cent. upon the value of the corn at Chicago. That is, the cost of moving the suit of clothes is fifty cents, and the cost of moving the corn is twenty-five dollars.

This shows that it is for the mutual advantage of both parties that producers and consumers should live in close proximity. It would be better for the farmers of Blandford that they should have factories here, whose operatives should consume their surplus produce, than that that surplus should find market in Westfield; better find market in Westfield than Springfield; better in Springfield than Boston; better in Boston than in Europe; and until the West becomes a manufacturing community, we need not envy them their markets nor wish to exchange our prosperity for theirs ; nor need we envy them their views of political economy, until they see that it is better not only to encourage manufacturing in their own midst than in Massachusetts, but also that it is better to encourage it in Massachusetts than to pay the half-fed, half-clad labor of Europe for manufacturing articles that must be paid for in corn or other bulky productions, to be produced and forwarded at a price to again compete with said depressed labor.

The West is envious of our prosperity, but they need not be, for nothing less than our prosperity will furnish them with an adequate market for their surplus produce. Their thrift is wholly dependent upon the prosperity of the East.

Imagine, for a moment, that our surplus produce had to be conveyed inland one thousand miles to find market. Do you think we should live as well as we do now? Should we dress as well as now? Should we spend money as freely as we now do? I think not. But rather let us comfort one another with the assurance that we are the best clad, the best fed, and the most enlightened yeomanry on earth, and have the most home comforts. And let not the thought that we are mingling with a prosperous manufacturing community (whose alimentary wants are feeding our pockets,) in any way discourage us; for we who are farmers to-day can be manufacturers to-morrow if we will only venture the experiment: but statistics show that they as a mass, fare but little better than we do.

For the benefit of those farmers and their families who see more attractions in village life and more densely populated places, and for the comfort of all who like ready markets and good society, I will say: We are living in the most densely populated State in the Union; a State increasing in population to the square mile more rapidly than any other State in the Union; a State in which the earnings are greater per individual than in any other portion of the known world; a State where the social and literary advantages are greater, and where knowledge is more universally diffused; a State where the poor, the unfortunate, and the friendless are more thoroughly cared for; a State where agriculture receives greater pecuniary and direct public aid than in any other State in the Union; a State whose public treasury is ready with open hands to lend aid to the society which is here this day represented.

"A contented mind is a continual feast," and fearing that with the uneasy inclinations which we have inherited from our primeval ancestors, we might not realize the extent of the prosperity, comfort and individual happiness which we may and perhaps do really enjoy, I have endeavored to show you that your lot is cast in pleasant places and that the rigor of this climate and comparative sterility of your soil is more than compensated by surrounding favors, and that the farmers of Massachusetts have little cause for discontent, and having assumed that content is the first requisite to the prosperity, the comfort and general happiness of a community, we now propose to consider some of the points which will be likely to make us better and more successful farmers.

One point worthy of consideration with the farmer is the determination to do his work at the proper time ; to be always in season. Better drive your work than that your work drive you. Those who planted corn and potatoes the earliest have the best crops. Those who sowed oats earliest have the most oats and the best quality. Crops hoed before the weeds have started are hoed with one-half the cost. Early cut hay is better for stock, and the after-math is good for the soil and for stock. Pumpkins and squashes suffer severely if exposed to the frost. Apples gathered early are saved from frost, and not wasted by exposure. Stock should be brought to the barns in the fall, before they have wasted in flesh by cold weather and frosty feed. Prosperity in farming can only be attained by close attention ; and this applies to all trades as well.

Another element of success with the farmer is a resolute, determined and persevering industry in one and the same direction. The success of man is only limited by the amount of persevering thought and determined resolution he possesses. To the persevering man there is no doubting or waiting ; he knows no to-morrow or next week, but it is one determined and resolute now. To him, mountains are but ant-hills, while ant-hills are mountains to the vacillating and fearful. Mature your plans ; work with a calculation beforehand. Have a fixed object in view at the beginning of the year, and bend all efforts towards that object. He who has an object in view at the beginning of the year, will have an object *to view* at the end of the year. Close planning will save much hard work ; and if we allow other men to do nearly all the thinking, we must expect to do nearly all the work.

Many farmers are too diffuse in their labors. Their prosperity would be increased and cares lessened and simplified by concentrating their efforts upon one point; by making some one of the diversified operations in farming a specialty. We find the profits of manufacturing very much increased by concentrating individual labor upon individual points, and it will apply with equal force to farming. And as this is a grazing section, cheese-making may be worthy of a few moments' consideration. When I say cheese-making, I mean factory cheese; for twenty-five years hence, cheese-making in private families will be as little known as cloth-making now is. By reference to the industrial statistics of Massachusetts for 1865, we find there was kept in Blandford at that time a stock equivalent to 2,394 cows. Now, allowing that 2,000 cows could be furnished to stock four cheese factories in the different parts of the town, giving 500 cows to each factory, and that the net produce of those cows was $60 each, the farmers of Blandford would receive the snug sum of $120,000 yearly. You may at first look upon this as visionary; but it will bear investigation.

There is another point in this connection to which I would call your attention; the strife and emulation which would be induced to see who should get the greatest amount of milk per cow, and who should keep the most cows. If one man was sending to the factory an average of thirty pounds of milk per day per cow, and another only twenty, the latter would soon be looking for better cows and better keeping. If one man was keeping twelve cows on a farm of one hundred acres, and another only eight, quite likely one would be looking to see where improvements would justify another cow; and soon two more cheese factories would spring up with the additional five hundred cows each.

There are those in Worcester County who realize $100 per cow annually from cows whose milk goes to the cheese factory; and I have the cow in view, from a dairy of thirty cows, and nothing but pasture feed, that gave, in the month of June, an average of 71½ pounds of milk per day for ten days in succession. The most given in any one day was 77½ pounds, and at one milking 41½ pounds.

I think an accurate account kept by the farmer of all farm transactions would put him on a track of thinking which would do more to raise the standard of farming than any other one thing. You may say you cannot afford to go through all that process. Allow me to say there is not a farmer in this house who can better spend ten minutes of each day, and one whole day at the end of the year, than in just such business. Just try it, and at the end of the year compare notes; review your accounts, and see which pays the best; see where you would have saved money that you did not; see where you have spent money that you need not. Farmers have no business to be guessing at conclusions all their lives. There is an old adage that "figures won't lie." One reason why farmers are so little inclined to keep accounts is, because they have not been educated to it. Book-keeping should be a branch taught in all our district schools. Its study would be vastly more useful than the study of algebra and higher mathematics. To be able to add, subtract, multiply and divide rapidly and correctly, and a knowledge of keeping accounts, together with a knowledge of fractions, is of vast importance to the practical man.

We sometimes see no less than some ten or a dozen buildings and appurtenances scattered about to make up a complete farm set. Neither for looks nor convenience is it desirable that the farmer should surround his premises with a multiplicity of small buildings, small yards and small lots. Let the farmer surround his home with thrift, neatness and order. Let it be embellished with fruits and flowers. Let there be a supply of desirable books and papers, that his children may be storing their minds for future usefulness, and not forced to seek in the bar-room and grocery an apology for that society they should find at home. The degree of civilization, the wealth and the general taste and refinement of a community, or of individuals, may be judged with great accuracy, by a glance at the surroundings of their home. From the Indian living in his wigwam, the Greenlander living in his hut of ice, the wandering Arab taking his tent with him, or the cottage of the domestic peasant of the nobility-owned soil of Europe (so domestic that his brutes are tenants of the same roof,) we pass through all the various stages of civilization to the clean, comfortable, beautiful, convenient and best arranged premises of the New England farmer; tastefully kept, carefully designed with reference to convenient location, convenience of internal arrangement, beauty of form and proportion; the house, perhaps, draped in tasteful simplicity, with festoons of living vines, and with surrounding ornaments of flowers and of shade and fruit trees, occupied by the intelligent and warm-hearted farmer, with his neat, tasty, frugal, industrious and affectionate housewife, their cares and labors being lessened by the aid of sons, bearing the image of the mother, and by daughters in likeness of the father, and who, through the diligent training of the experienced parents, are the aspiring candidates to like positions. All these may be seen in the rural portions of New England; and in no place on earth do we find nearer approaches to the garden of Eden, or a nobler and purer type of that being who was made in the image of God.

The farmer should feel that his employment is an honorable one; that in no class of society are found so many of the elements of human enjoyment as in that class who deal with the soil and all that pertains to animal and vegetable life. It is the common nurse of all persons in every age and condition of life. It is an innocent pursuit. It detracts from no man's reasonable enjoyment. It is an honest pursuit. It has nothing to do with the ills, the wills or the temptations of man. It makes no depredations upon the peace, the happiness, the safety or the purse of others. It was the primitive employment of man. The farmer should feel that labor is dignified, when associated with intelligent action. There is no employment which calls for so diversified and general knowledge as agriculture. As a science it has no limits. To make agricultural labor popular, it must be associated with the highest degree of intelligence, and the widest attainments in knowledge. There must be more thinking and less hard toil. We must promptly seize upon any new and useful inventions and mechanical improvement by which labor is lightened or made more effective. Every such improvement will increase the leisure of the farmer, and also his ability to supply his personal wants. "Knowledge is power," and the more extensive our attainments, the more easily shall we continue to acquire. The object of the farmer should be to increase the production and improve the qualities of animal and vegetable life, and to add thereby to the amount of his comforts and enjoyments. And this can best be accomplished by the acquisition of knowledge, which will give him greater power in his special employment, and also, a better position and more influence in society. Agriculture should be regarded more as an intellectual employment. Man makes a given force accomplish a greater piece of work in proportion as he is intelligent. Skill takes the place of muscle. A better product is obtained with less labor. Make men intelligent, and they will find a shorter process for obtaining results. They will become inventive. Make labor intelligent and you will enhance its value, inasmuch as mind is superior to matter. We yield to superiority of intellect, but not to brute force.

In society, men should not be known as farmers, as doctors, as lawyers, &c., but should be known as men. These are only the avenues by which they seek to promote their comfort and prosperity and gratify personal wants. To judge of a man, it is not necessary to inquire what he does, but how he does it. It is the man that determines the dignity of his occupation, and not the oocupation that measures the dignity of the man. Knowledge exalts; ignorance degrades. It is man's intellect that raises him above the brute. Knowledge gives position. We like to associate with our equals or superiors in knowledge. We must not be slow to make superior skill and knowledge take the place of hard labor. Many of our substantial farmers work too hard. We sometimes find men who can do an immense amount of hard work, and also of continued and close thinking; but they are "like angels' visits, few and far between." Farming will be esteemed honorable just in proportion as it is associated with refinement and intelligence. There is no reason why the farmer should not be an affable and polite man. To be so, he must practise a continued effort in that direction.

Let the farmer strive to make others pleased with themselves while they are in his presence. True politeness consists in the kindness of the heart, kindly expressed. The isolation of the farmer and his toilsome life render him liable to become coarse and awkward in manners and speech. The ability to converse with force and clearness, with grace and propriety, should be, therefore, a part of his study. It is not enough that we merely have knowledge. We must be able to impart that knowledge to others. Many farmers have native good sense without the power of using good language, and consequently they do not take that social position to which their good sense would otherwise entitle them. Speech is the grand distinction between man and the brute creation. But this is the result of cultivation and social intercourse. Our social rank depends very much upon our power to use correct language. An easy, fluent, graceful utterance gives one access to many social advantages; and these, in turn, afford aid to his utterance. A clear expression of thought enables us to exert a greater influence upon others, and at the same time strengthens the distinctness of our own perceptions.

Farmers should improve every opportunity to cultivate their social natures. Here we have one great use for agricultural fairs, farmers' clubs and farmers' festivals. It should not be the main question at our fairs: Did they have large cattle and fast horses; but was there a display of beautiful humanity? Were the people there with their joyful, friendly, familiar, social greeting? Was age, with silvery locks and fond memories of the past there? Was youth, glowing with vigor in high expectations of the future there? Yes, fathers and mothers, sisters and brothers, sweethearts and lovers, were all there; and as friend greets friend, there is an increase of self-respect, an exuberance of feeling, an intellectualized, reinvigorated flow of spirits, which send their shadow back ten degrees in the dial of Ahaz.

It is the attrition of mind with mind which polishes and gives vital force to man. He must take time for social intercourse and intellectual improvement. Conversation is the great recreation of life, stirring us to activity, cheering us around our hearthstones, moving the heart gently, often deeply; crowding the memories of years into moments, and kindling the purest and happiest emotions. Laughter and tears, smiles and blushes, are instinctive acts of man. He who can give the most intelligible expression of his ideas in the fewest words has the best command of language; and his command of language may be made more forcible by proper muscular action. There is a language in action, in the features of the face, in the expression of the eye—a language which speaks from the heart, and is beyond the utterance of the voice.

Encourage industrious habits in children with reference to usefulness. We are not sufficiently aware how immense is the benefit which would result in every way from this encouragement. Industry is the great preventive of poverty and crime. Were it universally inculcated and fostered in youth, there would be much less need of doctors and lawyers, and, as we think, of ministers.

Sons and daughters! strive to be useful. Let it be your pride in after years that you lent a willing hand to lessen the cares of the parental home.

And finally, man is an admirer of all that is beautiful in nature; and in the last manifestation of creative power and divine skill, there is a display of beauty unrivalled in any portion of God's works, and in that countenance in which are commingled beams of kindness, purity, good humor and modest blushes, going and returning like flashes of heat lightning in the summer twilight of a western sky, with the flashes of genius sparkling in the eye with a splendor which the brilliancy of no diamond can equal—transparent windows to the soul of intelligence and noble thought—such to man, is gentle, modest, pure, heroic and loving woman, reflecting her loveliness upon all around, like as the setting sun upon a world made richer and more glorious by the lingering radiance, casting reflecting rays of unwonted gorgeousness and splendor upon azure skies and gold-tint clouds. And for what did the Creator make objects so beautiful but to be admired, and for what has he endowed man with an exquisite sense of beauty, but that he may cultivate it and find therein a source of pleasure and delight.

It may be well that married men should speak their general admiration in modest tones, for who shall advocate the cause of that woman who is jealous without cause?

Modesty and beauty are woman's greatest adornments; but I am not sure that these always go together; and beauty without modesty may be repulsive, while modesty in woman is never repulsive to man. And for the benefit of those who may think themselves not handsome, I will say, "Handsome is that handsome does."

CULTURE AND SOCIAL POSITION.

From an Address before the Berkshire Agricultural Society.

BY ALEXANDER HYDE.

In conversation with an aged farmer recently, he complained that his sons had all left the homestead and gone into the neighboring villages and to distant cities to improve their social position, and despondingly asked, "What can be done to render agriculture more popular, so that our youth may remain at home and feel that they are as much respected while handling the plough as though measuring tape and ribbons? Unless something is done to elevate the occupation of farming, the soil of New England will soon pass into the hands of aliens, and Yankee yeomanry will be counted among the things of the past." This conversation gave the key-note to the following strain of thought:—

We sometimes hear the complaint that farmers are not appreciated; that they do not hold that social position to which they are entitled by their merits and numbers; that they are a minority in the halls of State legislation, and congressional honors are entirely beyond their reach. An indefinite feeling seems to prevail that society is wrongly organized; that it has an upper and an under crust, between which there is an impassible barrier; that some are destined to labor, and others to enjoy the fruit of their labors. This is a superficial view of society. The truth is, all men, both individually and collectively, are appreciated in the long run according to real worth. Outside of the conscience there is no tribunal before which a more accurate estimate of men is made than that of the community at large after an acquaintance of years. For a time individuals, like Dedalus, may make for themselves wings of wax and soar towards the sun; but like their prototype, they are sure finally to be plunged into a sea of confusion and shame. The talents and worth of others may for a time be latent, but if the fire of truth is in them, it will follow the law of caloric—diffuse itself and be felt. The mass of society is like a mass of water—it will find its own level. It may be true that farmers do not hold a share of the political offices of the country in proportion to their numbers; but political office is not the criterion by which the valuation of man is to be decided. We should be loth to believe that the highest office in the gift of the people is always filled by the wisest and best of men. This estimate of men by the offices they fill is too common even in republics. There is no criterion more uncertain.

> "Pigmies are pigmies still though perched on Alps."

We have had instances of men high in office, but low in character, and low in the estimation of their fellow-men, sufficient, one would suppose, to dispel the illusion that office is the standard of the man. There is keen satire in the sentence of Dr. Young,—

> "Has place or lessened or aggrandized thee?
> Then thou before wert something less than man."

Place, however, does aggrandize us in that it gives an opportunity for the exercise of the powers that are in us. It creates no new faculties, but it does give opportunity for the development of those we already possess; and if there is any truth, (and we are inclined to think there is,) in the common complaint that farmers do not have their share of the places of honor and emolument, we desire to do all in our power to remedy the injustice. But don't let us whine and complain that we are not appreciated. We are appreciated. We pass for what we are worth as well as any class in the community. When churches and school-houses are to be built, the farmer is sure to be remembered and to have his full share of the honor and expense of their erection. When taxes are assessed for the support of the government, the farm is not hid in a pocket-book, but stands out in bold relief and is always levied upon. When the honor of the country is to be maintained on the field of battle, the yeomanry are sure to constitute the rank and file of the army. It is not true, then, that farmers are not appreciated. They are acknowledged on all hands to be the backbone of community—the substratum of all society. The occupation of agriculture lies at the foundation of all other industrial pursuits. Mechanics, manufactures and commerce would find no material to work upon, did not agriculture furnish it? It is the primeval occupation of man, and the favorite pursuit of the wise and good from Adam down to the present time, and if we do not hold the social position to which we think we are entitled, let us not blame society, but rather say with Cassius,—

> "The fault, dear Brutus, is not in our stars,
> But in ourselves that we are underlings."

To point out some means of elevating the character and improving the social position of the farmer, is my object on this occasion.

In the first place, the prevalent notion that farming is merely a practical art to be studied in the barn and field, must be discarded. It is true of agriculture as of every other art, that science without practice sometimes leads astray, and practice without science never attains to leadership. It is only when theory and practice are combined that the highest success may be expected. It is said that a distinguished professor of mathematics in a college not far distant from here, who had taught his classes year after year the art of navigation, was once crossing the Atlantic and desired one day to heave the log and keep the course and distance of the ship. The reckonings were accordingly intrusted for a time in his hands, and as might have been expected, were not very accurately kept, though the sky was clear and the wind moderate. This is an example of science without practice. But would the result have been more satisfactory had a common sailor, accustomed all his days to the practical details of navigation, but unacquainted with the science, been intrusted with the command of the ship? It is the skillful captain alone, who understands not only the practical handling of the ropes, but also the laws of navigation, to whom we can safely trust our lives and property on the ocean. If his mathematical tables are lost, the scientific commander can make new ones. If his needle loses its polarity he can apply his magnet and remedy the defect. In his own brains he has resources for every emergency, to which the ignorant sailor cannot resort. The contrast between the common sailor and the skillful captain is no more striking than between the ignorant farm-laborer and the scientific agriculturist. The former may possibly, from long practice, handle the hoe and plough more dexterously than the latter, but he knows little more of the composition of the soil he is hoeing and ploughing than the horses and oxen in whose company he loves to spend his leisure time. Unless some seed-yeast of thought is introduced into his brains and they are set fermenting, he will continue the same routine of labor year after year that his father did before him, much as the oxen on the old Roman threshing floor went round and round treading out the grain. Progress and improvement are watchwords, the significance of which he cannot comprehend. It is brain work, or theorizing, which leads on to progress in agriculture, as in every other art. Not every theory tried by practical tests proves correct, but because some are visionary we must not condemn all theory. Had not Fulton first contrived in his brains the theory of the application of steam to the propulsion of boats, his boat had never been propelled up the Hudson. That was a trying time when he invited some of his friends to test, by practice, the truth of his theory. I never read the account without admiration of the genius and self-reliance of the bold theorist. Doubt and anxiety were depicted on the face of his friends, and when, after advancing a few rods, the boat stopped, they began to whisper, "I wish I was out of it," "it is all gammon," "gas," "moonshine," Fulton calmly replied, "Have patience, gentlemen, there is something wrong in the adjustment of the machinery; the boat will soon go ahead." And go ahead it did, and led the inventor to fame, and many a boat-owner to fortune.

Some may say this is all true with regard to navigation and the mechanic arts. They require some science in their investigation and development, but farming is a simple matter, demanding only stout hands and a willing heart. Never was a greater mistake. It has led to the ruin of many a farmer, and more than all other causes combined has operated for the depression of the farming interest, and the social inequality of which complaint is made. If the bright boys are selected for the professions and the blockheads for the farm, we must expect inequality—it is inevitable. But it is not true that agriculture calls into exercise solely or mainly the muscles and will. It is mind that governs matter, and no art demands for its perfect development so wide a range of science as the art of tilling the soil. This is not merely my assertion. It is backed up by the highest judicial authority of the State, for Chief Justice Bigelow says: "In order to be a good farmer a man must possess the best natural ability, and should have more information on a greater variety of subjects than a person in any other profession." If I remember rightly, I learned the art of navigation in one short college term, and thought I understood the theory as well as Captain Cook, or any other navigator who had sailed around the world, but agriculture has been my favorite study for years, and I still feel that I am a mere novice. The chemical laboratory of nature is a perfect mystery to me. The growth of a blade of grass is a miracle. How does it derive from the dead soil its wonderful life? Whence comes its perfect mechanical structure, its delicate coloring, exquisite perfume? How do the roots and leaves of barley and wheat imbibe from the same soil and air different properties, and produce such different grains? How does the tree convert the vile, decayed matter in the soil, into the fragrant, delicious, health-giving peach? These are processes beyond the ken of the chemist. Science has labored for years on the more practical questions. What does each crop take from the soil? What are the most economical means of restoring to the soil the elements which each crop must take away? And how can an original deficiency for the production of any specific crop be most easily remedied? Much progress has been made in elucidating these points. Liebig in Germany, Johnston in England, and Johnson in our own country, have devoted the energies of their lives to the development of the theory of agriculture, and their works are worthy of most careful study. Johnston's Agricultural Chemistry should be a text-book in every farmer's family. It is full of instruction on every point connected with our noble occupation, and I cannot too highly commend it for your perusal. None are so poor that they cannot afford three books in their library, and the first of course should be the Bible, the second Webster's Unabridged, and the third Johnston's Agricultural Chemistry. The library will not be complete without a fourth volume, and for this I name "The works of the immortal Shakspeare," the great delineator of human character, who played with the passions and humors of men as a skillful violinist plays with his strings. It is a mistaken notion that the farmer's library should consist of works on agriculture solely. These are good so far as they go, but perusing these alone we should become men of one idea. Farming is our occupation, and with its principles and practical details we should endeavor to be as familiar as is the skillful physician with the anatomy and physiology of the human body. But the world is wide, and there are other sciences and other pursuits besides agriculture, and if we wish to be men among men, we must educate the whole man. If some of our faculties are developed and others dwarfed, we become terribly one-sided. We become monsters, not men. For the perfect development of our manhood we shall need, besides the four books already mentioned, a live agricultural paper, to keep us posted as to the latest inventions in machinery, the recently discovered seedling fruits and tubers, and fresh suggestions from the practical culturists of the present day. A daily newspaper is also an essential educator in these fast days. The local weekly is good in its place, and we hope the "Sun" will ever shine and the "Eagle" ever soar over Pittsfield, but no man, whether farmer or mechanic, should go to bed without knowing what Queen Victoria had for dinner; and what were the last movements on the political chess-board of Louis Napoleon and Count Bismarck. The newspaper of the present day is the great educator of the masses. The quarto sheet contains a volume of miscellanies, and treats of more subjects than Solomon ever dreamed of, though "he spake of trees from the cedar that is in Lebanon, even unto the hyssop that springeth out of the wall, and of beasts and of fowls, and of creeping things, and of fishes."

We rejoice in the assurance that this matter of agricultural education is receiving in our day, and especially in our State, something of the attention which its importance demands. We have long had our schools for the prophets, our normal schools, and schools for the lawyers and doctors; and yesterday was opened, under most favorable circumstances, the first session of the Massachusetts Agricultural College. A telegram received from President Clark this morning announces that thirty-four young men were yesterday examined for admission into this college. Thus one bugbear that the opponents of the college have always brought out, that farmers' sons would be unwilling to devote so much time in a thorough preparation for their profession, has disappeared at the outset. We call farming a profession now, for why is it not entitled to rank among the learned professions, since we have a school specially designed to educate men for this calling? We hail the institution of this college as an omen of the highest good in the future of the farmers of New England. We have a rigorous climate and sterile soil; but this very rigor and sterility, though great drawbacks in the production of crops and rearing of stock, are stimulants to mental activity and bodily vigor. A lazy, shiftless farmer in Massachusetts must either move West or starve. As the cold, bleak hills of Vermont have a tendency to produce fine wool not only on the backs of sheep but on their faces and legs, and in folds all over the body, so that although the Vermont shepherd cannot compete with the Texan in the wool market, he has succeeded in producing a breed of sheep which has taken the first premium at the world's fair, and is sought for at fabulous prices on both sides of the Atlantic, so we here in Massachusetts, if we cannot compete with the fertile valleys of the West in raising wheat and corn, can raise something far more valuable—we can raise men—and the demand will come up for them from all parts of the country as educators. As the Vermont merinos are needed South and West to restore the quality of the flocks deteriorated in the warmer climate and by the coarser herbage, so Massachusetts men will be called abroad to teach and practise the principles of restoring a soil wasted by unskilful cultivation. Millions of acres of such soil, worked by ignorant laborers under the management of negligent masters, are now in the market, only needing intelligent and energetic men to make them bud and blossom like Eden.

There is one feature in our Agricultural College to which I desire to call the special attention of the men before me. It is the popular course of lectures to be given each winter by the most scientific and practical agriculturists of the country, each discoursing on the topic with which he is most familiar. It is too late for those of us who have reached the meridian of life to think of going to college and graduating with our bachelor's degree—our wives have driven all bachelor notions from most of us—but we are not too old to learn, and Amherst is just the place for us to learn, and this course of lectures is just the mode for teaching us. The social influence of such a gathering of the best farmers of the State as will be seen at Amherst each winter, will more than pay for all the trouble and expense of attendance, and the lectures promised by Professor Agassiz, Secretary Flint, Dr. Loring, Mr. Bull and others, cannot fail to be of the highest interest. The course is designed not so much for the students of the college as for those already engaged in the pursuits of agriculture, and we hope the farmers of Berkshire and of the whole State, will appreciate this effort made in their behalf. We need such an annual re-union to get out of the ruts of thought in which our minds are inclined to run in our solitary life, and by contact of mind with mind, to mould and polish each other. It will be a farmers' club on a large scale and of the highest order.

We have dwelt somewhat at length on intellectual culture as a means of elevating the social position of the farmer, because it is emphatically *the* means sure of accomplishing the end ; but there are one or two other means eminently conducive to the same result, to which I desire briefly to call your attention ; and the first is, good manners. I have sometimes feared that as a class we have deserved the sneer implied in the phrase, "rustic manners." We have prided ourselves on our plain, honest, blunt ways, and possibly have undervalued the polished, affable manners which mark the gentleman. Our isolated mode of life also is conducive to strength rather than polish. The latter comes mainly by intercourse with our fellow-men. By good manners I do not mean the scraping and bowing and outward show which bespeak the fop, but the ease and grace which distinguish the gentleman from the boor. They are the natural outgrowth of a benevolent disposition, and are by no means to be despised. They are essential in the pleasant intercourse of man with man, and if we desire a higher social position we must make our manners a subject of thought. A clown introduced into polite society is fitted neither to give nor receive pleasure. He feels like a cat in a strange garret, and is on the lookout for some opening through which to make his exit. Good manners are the oil which makes the machinery of society move without friction. They are the "minor morals," as Miss Sedgwick calls them, not as essential as integrity and purity, but they add vastly to the comfort of all social intercourse. There is a heresy somewhat prevalent in the community that supposes integrity and politeness to be incompatible. We have all met with men who prided themselves on being above deceit, and speaking out bluntly just what they felt, no matter how ungracious and uncharitable their feelings must be. To all such we desire to commend the Scripture injunction, "Speak the truth in love." If we study to act out the precept of loving our neighbor as ourselves, we shall become truly polite; for Witherspoon defines politeness as "real kindness, kindly expressed." We have no admiration for the Lord Chesterfield school of manners, which studied effect and outward show. The Christian school is infinitely superior, which commands us to "be kindly affectioned one towards another, in honor preferring one another." This lays the foundation upon which the superstructure of good manners should ever be built. There is no question but that there is as much genuine kindness of heart in the country as in the city; still rusticity, which, by its etymology, signifies life in the country, is now the term for coarse, awkward manners; and urbanity, which originally signified life in the city, is now defined by Webster as "that courtesy which is acquired by intercourse with well-bred people." Benevolence, therefore, though lying at the foundation of good manners, is not a guarantee for the superstructure. We need, as the unabridged indicates, "intercourse with well-bred people." We need to put a just estimate upon the value of polished manners, and make them a subject of thought, not giving all our mind to them as the fop does to the tying of his cravat, but that attention which their importance demands. We need to observe how others conduct who are more favored with natural grace, and are placed in circumstances to acquire polish of manner, and imitate their example. Fortunately, the country is not so rustic that we are totally deprived of examples of the greatest urbanity. All the older portion of those present will bear me witness, that no brighter example of courteous manners need be sought for either in city or country than was furnished by the late Sheriff Brown of this place. Whether conducting the judge to his seat on the bench, or assisting an old lady into her carriage at the church door, the true gentleman marked all his movements and all his words. I well remember the bland smile with which he used to pass us boys, playing ball in the streets of Lenox, turning his horse out of the road so as not to interrupt our sport, while other travellers often seemed to take a malicious pleasure in dashing over our wicket sticks, (base ball was not in fashion then.) As the sheriff rode by, the universal feeling was, and it often found vent in expression, "He is a gentleman." If Sheriff Root were not present, I would add the county has great reason for congratulation that the mantle of Sheriff Brown has fallen upon so worthy a successor. We might conclude from the gentlemanly bearing of our sheriffs that there was something in the air of our courts necessarily leading to courteous manners, but the wrangling of the lawyers forbids such a conclusion.

A Christian should ever study to be a gentleman. We are poor followers of our meek and lowly but divine Master if we do not strive to imitate the only perfect example of courtesy that was ever exhibited on the earth. When he was reviled, he reviled not again. When mocked, scourged and crucified, his feeling for his enemies was a mingled one of pity and compassion, and his prayer was, "Father, forgive them, for they know not what they do." Still there was no cringing fear in the presence of those who were above him in station; no want of decision and manliness, as the Temple bore witness when defiled by those who had made it a "den of thieves."

If the isolated life of the farmer tends to make him awkward, he should study all the more to overcome this obstacle to his advance in social position. The command, "Be courteous," is binding upon all men—is just as applicable to the farmer as to the attendant upon the kings' courts. Nor are we wanting in examples of polished gentlemanly manners among those who follow the plough for a living. I have in my mind's eye a farmer living not two miles from my own home, now past his threescore and ten years, all spent in hard labor upon the farm, whom I never approach without the feeling of respect which the courteous, dignified air of a gentleman always inspires. I have met him frequently from my boyhood and under varied circumstances, in his barnyard and in his parlor; but whether seated on a three-legged stool milking his cows, or in a more undignified position shearing his Cotswolds; whether clad in towcloth or broadcloth; whether tending his stock or waiting upon his guests, the feeling always is, you are a gentleman. What one farmer has done another farmer may do. Good manners will always introduce a man into good society; intelligence and virtue only can sustain him there. Let these three requisites be combined in our rural population, and I have no fear for their social position. They will rise to the top as naturally as cream rises to the surface of a pan of milk.

There is one other means of elevation for the farmer to which I desire briefly to allude, and this is, a determination to magnify his occupation and excel in it. I have sometimes met with tillers of the soil who seemed to feel ashamed of their business, as though there was something degrading about it. All such may expect to be inferior farmers, and to hold an inferior position everywhere. A man is valued in society much as he contributes to the good of society and excels in his calling. In order to the attainment of excellence in any occupation, we must have a love for it. Enthusiasm may sometimes lead to failure, but never to inferiority. So far is agriculture from being a degrading employment, we hesitate not in pronouncing it the most elevating and dignified of all manual pursuits. Kings, emperors and presidents may follow it without compromising their dignity, and may leave their high offices and engage in its pursuit without any feeling of degradation. Washington, looking after his broad acres at Mount Vernon, was the same gentleman and commanded the same respect as when directing the army or guiding the ship of State.

In order to the attainment of excellence in agriculture, we must not only have enthusiasm for the pursuit as a whole, but must follow the dictate of circumstances and the bent of our genius in some particular line. Farming is a comprehensive term, including many distinct pursuits. The rearing of young stock, the fatting of beef, sheep husbandry, dairy, grain and fruit farming, are only samples of the branches into which farming runs. Now the trouble with many, I might say with most farmers is, they undertake to ride too many horses at once. As science and civilization advance, there comes a greater division of labor, and consequently greater excellence. Dentistry, surgery and medicine, were only a short time since all included in one profession; now we do not trust our teeth in the hands of the surgeon who gives his whole attention to the bones and muscles, much less in the hands of the physician who furnishes pills, powders and drops for the stomach. If farmers desire to keep up with the times they must study this division of labor, and by concentrating their energies on some specific branch, rise to eminence. We have among us some notable examples of the success attainable by this concentration of effort. Some ten miles south from here lives a friend of mine on his broad ley—contracted into Bradley—who for years has made the bees his study. The consequence is, he knows all about them, handles them with impunity as a child does the kitten, makes an abundance of honey, and what is better an abundance of money. His fame may not be as extensive as Solomon's, and we never knew the queen of Sheba come to visit him, but the she bees go at his bidding to all parts of the country, and he has more kings and queens as his guests daily than Solomon ever heard of. If my friend has not a high social position, then daily association with royalty cannot confer it. At all events, he has the consciousness of eminence and usefulness in his line, adding sweetness to the life of multitudes, and governing a hundred colonies that cheerfully pay him a large income tax. I know of no other farmer in the county who has so many laborers in his service, or directs his employees more skilfully. But we cannot all associate with kings and queens, nor have such a retinue of servants, as the broad-ley farmer.

I will refer you only to one other example of great success in turning attention to one line of farming. Some ten miles east of us, on the hills of Hinsdale, lives a young farmer who has made a specialty of raising stock. Though scarcely out of his teens, his name stands high on the list, if not at the head, of breeders of Durhams. He surely has no reason to complain of his social position, for dukes and duchesses constantly share his hospitality. So well bred is his stock, that a single animal is worth more than a large herd of the common grade. We do not all have the facilities for special farming which the young Hinsdale farmer possesses, but we all have tastes which incline us to one branch of farming rather than to another, and I am sure if we cultivate this taste and bend our energies in this one direction, we shall have more satisfaction in ourselves, do more good to society, and consequently stand higher in the estimation of our fellow-men. I would not advocate exclusive attention to one branch of farming. This would be putting all our eggs in one basket, but let there be one leading pursuit, to which all others are subservient, and with common skill and industry we must excel and make for ourselves a name and a place among our fellow-men. Let us all labor with the diligence and system of the examples to which I have alluded, and we shall have no complaint to make about our social position. Let us act well our part, and honor will follow us as a shadow does the substance. If we are only true to ourselves, our country and our God, our social position will regulate itself.

THE AGRICULTURAL SOCIETY.

From an Address before the Hoosac Valley Agricultural Society.

BY GEORGE B. LORING.

Agricultural societies have constituted the most useful agricultural schools for the last century. They have appealed to the practical agriculturist in the most direct and forcible manner, and they have furnished opportunities for observation to the old as well as the young. When well endowed they have diffused knowledge, both by publications and by exhibitions, and in this way have they enabled the landholder, who is obliged to confine himself to his business to obtain his information, and to apply it to his daily practice. They constitute the best of schools—those in which all are teachers and all are learners. And they may be made the great depositories of theories confirmed by experiment, of facts obtained by observation, and of rules of practice laid down by successful industry, from which every farmer may draw his knowledge, and which will be as far superior to an organized school, as their sphere is larger and more diverse, and their teachers more numerous and more devoted to the business of farming as an honest and honorable means of subsistence.

In claiming for an agricultural society superiority over an agricultural college as a means of collecting and diffusing agricultural knowledge, I do not intend to undervalue the latter. The foundation of all knowledge of agriculture is the accumulation of fixed facts, suggested perhaps by accident, discovered perhaps by science; but however obtained, proved or confirmed by the practical farmer on his land. Now to the records of an agricultural society may come the tests of every theory advanced from a large territory, from a variety of soils, and from a considerable number of different modes of farming. A theory which bears this test may become a law at once for the farming community, and until it has borne such a test it is theory still, no matter what its origin may have been, whether college or farmyard. While, therefore, an agricultural school can be no more than a collection of intelligent gentlemen, devoted to science as a guide to agriculture, and engaged in cultivating a single farm according to the best known principles, it must depend upon a wide-spread community of farmers for the last grand process of proving and diffusing its theories. And when we remember that agriculture is not an exact science, and cannot be until the skies and seasons are subdued by man, and that the facts discovered in the field by the diligent cultivator are often of more practical value than those laid down by the student in his closet, we shall not be surprised at the superior success which societies have thus far met with as compared with schools in the work of advancing agricultural education. I say *have thus far met with*, because I think there is valuable work yet to be done by the schools, which it would be well for our States to remember in founding their agricultural colleges.

Why, gentlemen, all the literature of agriculture goes to confirm this view. The books to which the farmer turns most eagerly for knowledge are those which contain just those facts to which I have referred as a part of the treasury of an agricultural society. Arthur Young, traversing all England for the materials out of which to write his admirable volumes; Jethro Tull, toiling with his own hands in order to extract from the soil itself the doctrines of horse-hoeing and drill husbandry with which to enrich his native island; Mr. Cully, devoted to the improvement of cattle as the best college in which to learn how to discuss their breeding and feeding; Fitzherbert, who, although chief justice of common pleas, was, as he tells us, "an experyenced farmer of more than forty yeares," and wrote the "Booke of Husbandrie;" and so the admirable writers of modern days, all write from the great standpoint of experience. What richer fountain of agricultural knowledge can be found than the transactions of the Royal and Highland Societies? Where can a better lesson be read than is contained in those modest volumes issued annually by our local societies, and containing the recorded experience of the successful farmer of the neighborhood? We turn to this with confidence and hope, and we turn from it with new light and courage for the pursuit of our calling. Levi Bartlett, writing from Warner, N. H., Dr. Holmes, in his lifetime making his weekly record in a quiet town in Maine, furnish that kind of knowledge which, gathered from the experience of every surrounding farm, is made useful to all farmers. What a treatise on sheep-husbandry might be written by sitting at the fireside or roaming over the pastures of Vermont farmers, and taking notes of their experiences and labors in the business which they have brought to such perfection! What funds of information upon the cultivation of crops, the management of orchards, the use of manures, the conduct of the dairy, lie concealed in the farmhouses along these valleys and hillsides! The practical teacher and the truly scientific explorer know this. And the great naturalist of America recognizes its truth, when, with constant and unwearied toil he gathered a long array of facts from the breeders and exhibitors of the remarkable collection of animals at Springfield a few years since, and stored them away as valuable material for his lectures and investigations during the coming winter. Agassiz learning of Lang how to breed horses, and of Lathrop how to breed cattle, and of Hammond how to breed sheep, was the greatest tribute of science to practice that has yet been seen, alike significant of the wisdom and humility of the great *savan*, and of the sound sense and success of the intelligent farmers.

I behold in this that rare combination of "practice and science" which should be the desire and motto of every farmer and every farmer's association, and is the foundation of the farmer's best knowledge. Let the example thus set be followed always and everywhere. Let our scientific teachers learn to respect the practical knowledge of the farmer; and let the farmer lay aside his jealousy of the learning of the schools. To this just and proper combination of mental forces, how would the earth unfold her secret, how would the fields rejoice under well directed cultivation, how would the whole animal economy of the farm be developed and improved, how would the whole business of agriculture be brought into subjection to systematic laws, and what was before dark be illumined by the highest light vouchsafed to man by the great Creator and Preserver of all! And not this alone. How would the farmer learn to respect his calling, and to feel that the work intrusted to his care is worthy of the most profound thought and the most careful investigation! I can conceive of the intellectual and moral and social elevation which would follow, and the material prosperity which would attend upon such elevation. For to us of all people, free-holders, endowed with all the sacredness of domestic and civil rights, possessed of our own lands, dependent each for himself on our own intelligence, is the opportunity given for this development and general diffusion of knowledge.

Without this combination, deprived of the accumulation of facts of which I have spoken, science in agriculture becomes powerless; with it, it becomes a most important ally to the farmer; in fact it is reduced to one mode of practice itself, and thus becomes of the highest value, and meets with its highest success. For it is easy to see why practice is so powerful in providing the best of agricultural knowledge, and why it has thus far outstripped science in the advantages it has bestowed. It is because the real foundations of agriculture cannot be explored by any human power. In whatever the farmer does he is obliged to recognize an influence which the hand of man cannot reach, which no investigation can fathom, no human power guide. Agriculture obeys the laws of nature, and can do no more than use the natural forces with ingenuity and skill. Science endeavors to explain them; and to ascertain if possible the natural laws upon which the farmer depends. In doing this it advances into that great region where lie the vital forces which are shut against all human intrusion. And on this account it is very apt to be overthrown by agricultural facts. Liebig goes on from one theory of fertilization to another, and the growing crops of the neighboring farmers pronounce them all to be false. Science may attend upon agriculture as a stimulus to the best exertion, as a guide in the use of fertilizers, as an aid in the selection of soils. But it is the patient, and prudent and experienced farmer after all who knows what land he needs, has unbounded confidence in that great receptacle to which he consigns his manure, and to the vivifying power of that great mother into whose lap he casts his seed, and who gathers his crop before his scientific neighbor has half finished an analysis of his soils. It is the judicious observer of cattle, and the wise and observant judge of their necessities and capacities, who, regardless of the theory of the physiologist, secures animals adapted to his own locality, and perpetuates and improves them by confining himself to his own herds for means of increase.

It is important to bear this in mind in our estimate of what the community requires in the way of agricultural education. We may so misdirect our attempts to enlighten the people on this matter as to lead them away from the farm instead of encouraging their hearts and strengthening their hands for the business of agriculture. We may become so confused and shaken in our trust in the laws of nature by our investigations as to lose that love of all her works, which lies at the foundation of good farming. But if by steady progress in the accumulation of facts which are indisputable, and by patient devotion to the work of drawing sound deductions from those facts, the wonderful attractions of nature are revealed, and her unerring fidelity is confirmed, the student of agriculture may go forth from the college to his occupation, bound not by necessity to the drudgery of his farm, but devoted with all his powers to the business of agriculture as an ennobling, useful and profitable art.

In saying this I endeavor to estimate science aright. We all know the value of scientific men. We all know that they have revealed to us those great laws, a knowledge of which has elevated us above the grovelling regions of superstition and ignorance and terror, into the high heaven of Christian admiration and reverence. They have taught us how to purify our cities, how to retain our health and how to regain it, what we are in the scale of being, and to what a marvellous system of grand and subtle forces in the animal and vegetable and mineral kingdom we belong. We know how much they have done to enlighten and civilize mankind. But when they enter with us upon the field of agricultural investigation, we ask them to pause with us before that unexplored region where lie the strange forces which we and they admire, obey and leave with the great God who made them.

Come now, O practical farmer with me, and see what you have done for the development of your calling, guided by the light of experience alone. You have discovered that remarkable system of drainage by which the hard and unyielding bed of clay becomes, through the agency of a simple circulatory tube, as obedient to the hand of the cultivator, as the warmest and most fertile loams. You have brought out of wild and useless classes of plants the nutritious grains and luxuriant fruits which nourish and delight. You have seized and tamed the species of animals adapted to your wants, and have produced every variety of breed which diversity of soil and climate and market may require. The heavy Shorthorn makes haste to repay you for his food by a rapid production of beef. The hardy and patient Ayrshire devotes all her faculties to an abundant supply for your dairy. The clumsy draught horse learns readily the duty which you have imposed upon his phlegmatic family. The racer and roadster are ever alert in the service to which you have especially assigned them. You have learned the capacity of your lands, and understand what fertilizers they require, as well as you know the food which will best nourish your domestic animals. You have discovered how to subdue nature, and go forth to the first step of the process with axe upon your shoulder, as confident of the result of the contest as if the blooming fields were already before you. Out of your number came Cavour, who, in the intervals of his public life, was the most successful farmer of Northern Italy; and Mechi, whose practical operations as recorded have become one of the text-books of farming; and Marshall, who learned to manage his own lands, and who declared that "attendance and attention will make any man a farmer;" and John Johnson, who has taught us all how to raise wheat on drained lands, and Parmentier, who was obliged to turn farmer before he could overcome popular prejudice and introduce the potato into France. From among your number have come the clear-sighted and unerring and quick-witted workers, who have made immediate application of every good suggestion and have brought agriculture to a high standard. To you belong especially that class, who, having acquired their knowledge, reproduce it in some useful form for the practical benefit of mankind; that class whose minds are not so burdened with theories that when the moment for action comes they lose sight of the very object for which their theories were constructed.

Bulwer, in one of his essays, tells an admirable story to illustrate the readiness with which some of you do, and all of you should, apply the knowledge which comes to your minds when they are intent on your occupation.

"A certain nobleman, very proud of the extent and beauty of his pleasure grounds, chancing one day to call on a small squire whose garden might cover half an acre, was greatly struck with the brilliant colors of his neighbor's flowers. 'Ay, my lord, flowers are well enough,' said the squire, 'but permit me to show you my grapes.' Conducted into an old-fashioned little greenhouse, which served as a vinery, my lord gazed with mortification and envy on grapes twice as fine as his own. 'My friend,' said my lord, 'you have a jewel of a gardener; let me see him.' The gardener was called—the single gardener—a simple-looking young man under thirty. 'Accept my compliments on your flower-beds and your grapes,' said my lord, 'and tell me, if you can, why your flowers are so much brighter than mine, and your grapes so much finer. You have studied horticulture profoundly.' 'Please your lordship,' said the man, 'I have not had the advantage of much education; I been't no scholar, but as to the flowers and the vines, the secret as to training them just come to me, you see, by chance.' 'By chance? Explain.' 'Well, my lord, three years ago master sent me to Lunnon on business of his'n, and it came on to rain, and I took shelter in the mews, you see, and there were two gentlemen taking shelter too; and they were talking about charcoal, and one said it had done a deal of good in many cases of sickness, and especially in the first stage of the cholera; and I took a note on my mind of that, because we'd had the cholera in our village the year afore, and I guessed the two gentlemen were doctors. And one of the gentlemen went on to say that charcoal had a special good effect upon all vegetable life, and told a story of a vine-dresser in Germany, I think, who had made a very sickly, poor vineyard one of the best in all those parts, simply by charcoal dressings. So I naturally pricked up my ears at that, for our vines were in so bad a way that master thought of doing away with them altogether. Well, before I tried the charcoal on my plants, I went to our nurseryman, who has a deal of book learning, and I asked him if he'd ever heard of charcoal dressing being good for vines, and he said he had read in a book that it was so, but he had never tried it. He lent me the book, and I tried the charcoal in the way the book told me to try it, and that's how the grapes and the flower-beds came to please you, my lord. It was a lucky chance that I ever heard those gentlemen talking in the mews, please your lordship.'

"'Chance happens to all,' answered the peer, sententiously, 'but to turn chance to account is the gift of but few.'

"His lordship returned home, gazed gloomily on the hues of his vast parterres; he visited his vineries and scowled at the clusters; he summoned his head gardener, a gentleman of the highest repute for science, and who never spoke of a cowslip except by its name in Latin. To this learned personage my lord communicated what he had heard and seen of the benignant effects of charcoal, and produced in proof a magnificent bunch of grapes which he had brought from the squire's.

"'My lord,' said the gardener, scarcely glancing at the grapes, 'Squire ———'s gardener must be a poor ignorant creature to fancy he has discovered a secret in what is so very well known to every [professed horticulturist. Professor Liebig, my lord, has treated of the good effect of charcoal dressing to vines especially, and it is to be explained on these chemical principles,'—therewith the wise man entered into a profound dissertation, of which his lordship did not understand a word.

"'Well, then,' said the peer, cutting short the harangue, 'since you know so well that charcoal dressing is good for vines and flowers, have you ever tried it on mine?'

"'I can't say I have; it did not chance to come into my head.'

"'Nay,' replied the peer, 'chance put it into your head, but thought never took it out of your head.'"

His lordship knew very well that a man who makes good use of the ideas received by chance will make a still better use of ideas received through study. He therefore discharged his learned but thoughtless gardener, and employed the observing and intelligent young man who had conducted the squire's plants with such brilliant success. You can imagine the result which followed.

The peer and the gardener have both learned the value of observation, the usefulness of theory and practice combined, and the folly of ascribing a successful experiment to chance. And we may learn from this lesson to cherish those hints which are derived from experience, and to apply them with that activity and skill which make our successful, practical farmers. Ascribe nothing to chance, but, with minds ever open to new impressions, accept the thoughts of others, and use them with industry and skill in your daily toil.

I present this view of the value of practical information as the basis of our progress in agriculture, because it is the only foundation upon which we can build. We, as a people, are rooted upon our soil. We have the agricultural traditions of a long line of hardy, industrious and prosperous farmers. The laws by which they have subdued the earth are our text-book in all our operations on the land. The mode of cultivation by which they raised extraordinary crops, and their selections of animals by which they secured remarkable herds, are a part of our instruction, handed down by tradition, or imprinted on the farms which they bequeathed their children. We may dwell with delight upon the power of education to elevate and refine a people; we may elaborate our system of schools; we may spread knowledge broadcast over the land; but we should never forget that the best rules of New England farming were laid down here by the sturdy yeomanry whose strength civilized these hills, in whose hands the material prosperity of our State rested half a century ago, whose ample abodes still remain in our villages and along the roadsides, whose social position was won by solid merit, who constituted that intelligent rural population from whom the merchants, the lawyers and divines, and statesmen of our day have sprung, and whose homes are still waiting for a return of that wealth and intelligence which long ago deserted them. We of New England should never forget this. In our busy and restless and ambitious life, we have poured all our best powers of mind and body into our towns and villages, and exhausted them in the counting-room or the forum, or in the hard toil of the inventive arts. We have forgotten our old rural homes—those broad fields, those overshadowing trees, that substantial New England dwelling, whose very presence even now tells of the staunch and reliable virtues of those who have long since gone to their rest. We should know that the charm of life is not in our cities and large towns. Neither our moral nor our religious nor our physical natures can be developed with that beauty of proportion of which man is capable, so long as we prefer the feverish excitement of the busy concourse of men, to the healthy and placid and refining and ennobling influences of a cultivated rural life. There are charms in the unceasing current of life which flows through the forum and the market-place. There is a fascination, as Mr. Choate once said to me, in "the newspaper and the post-office," above the music of the sounding sea and the silence of the lonely shore. But, when we remember the annoyances which meet us at every corner, the petty strifes of men, the struggles and distresses, the efforts and disappointments, shall we not sigh for the rural respectability of our fathers and exclaim with Cicero, "There at my Laurentium, I hear nothing that I repent to have heard, say nothing that I repent to have said; no hopes delude and no fears molest me. Welcome then life of integrity and virtue! *O, dulce otium, honestumque, ac pœne omni negotio pulchrius!*" We must learn once more to love the land; to love it as our fathers loved it, to love it as the people of old loved it, whose great men enjoyed their favorite retreats, and "listened many a returning spring to the nightingales that tenanted the dark ivy and greeted the narcissus, ancient coronal of mighty goddesses, as it burst into bloom under the dews of heaven." When from our New England cities which have received their life-blood from the country, there flows back a current of wealth and intelligence to beautify our towns, and cultivate our fields, we shall make our land still more the fit abode of a free and intelligent people.

And now one word in behalf of agricultural societies, as nurseries of this rural love and taste of which I have spoken. Not alone ambition excited by a peaceful strife for supremacy on the fair grounds here; not alone the desire to excel, awakened by some successful competitor; not alone that useful knowledge which may be gained by the observation and discussion on occasions like this; not all this alone constitutes the benefit of your exhibition. There is the exhilaration which the blood receives from association; where, divested of all care, "face answereth unto face." These cheerful assemblies, do they not gild the way of youth, and make the old feel young again? Do they not enhance the value of our lands and crops and flocks and herds in our eyes, and do they not, moreover, give us renewed interest for the enjoyment of those possessions? Here, then, let us have our annual rural sports. And when the formalist or ascetic charges upon the people of New England a growing mania for the track and trotter, let us point to our hilly pastures, which produce the hardiest horses in the world, and then ask him whether, amidst the cares and toils of farming life, after diligent study of the more sober products of our fields and stalls, we may not take this other gift aright, and learn to develop, and cherish, and enjoy, and protect that favorite animal, which is intimately associated with all our enjoyments and sorrows, and whose comfort in this world depends on the respect which a kind-hearted master knows how to entertain for him. Let this then be our New England rural sport, if need be, properly conducted as a feature of our exhibitions, and controlled by propriety, honesty and good judgment. But let us have our pleasure still, and not hope to rise to superior moral excellence by chilling the blood in our veins, and regarding the sunny side of life as overgrown with frivolities, beset with temptation and blackened by crime. In this way shall we love our calling the more. In this way shall we educate ourselves into the bright and cheerful regions which belong to a free rural population, and in this way shall we learn how to make such anniversaries as this, more useful, more influential, more instructive, more agreeable and attractive. If we would know each other better, let us unite in giving new vigor to these associations; if we would know our occupation better, let us rouse all our faculties by joyous intercourse here, and thus become enthusiastic recipients of the knowledge which belongs to our occupation. For this association may be a source of much advantage to you as a fraternal assembly, all loving the land, all devoted to the honor of our State, all understanding the capacity of our people for advancement and for kindly social regard. Said Governor Holbrook, of Vermont, in an address delivered at the opening of the State Fair, in 1851:

"And now, farmers of Vermont, what is our object in coming together on this occasion? Is it not to become better acquainted with each other, and to form ourselves into a permanent organization for our own mutual benefit and improvement, and for the advancement of the agriculture of the State? Dr. Brewster, in enumerating the advantages which had resulted from the establishment of the British Board of Agriculture, remarks, that 'before the board was instituted, the bond of connection among agriculturists was slender and served few useful purposes. Each trusted to his own information, and knew little more about the practice of conterminous districts than that of China, or the most distant country. The establishment of the Board removed at once all these evils and difficulties. It made farmers who resided in the most distant quarters of the kingdom acquainted with one another, and caused a rapid dissemination of knowledge among the whole profession. The art of agriculture was brought into fashion ; old practices were amended and new ones introduced, and a degree of exertion manifested which had never before been exemplified on this island.' All history teaches us that it is of the first importance in the accomplishment of great objects of improvement, to collect men together and bind them in an association for that purpose. An institution for the improvement of our agriculture will bring the intellect of the State to a more powerful bearing upon that subject. Thus collected and organized, we shall see and hear and learn new things, and learn them in such a manner as to make an indelible impression and to exert a practical influence. Instead of resting upon ways as good as any in our immediate neighborhood, we shall compare ourselves more extensively with others and improve accordingly. An enthusiastic zeal will be awakened, useful knowledge in all departments of husbandry will be scattered broadcast over the State, our farms will be made more valuable, our homes more pleasant and comfortable, and our income more abundant."

As we meet thus in fraternal council and congratulation, and gaze upon the collections in the various branches which constitute an agricultural exhibition, we must wonder at and admire the forces which are constantly at work for our calling. How has the earth labored in all haste during the short summer season, " the sixty days of corn weather," to bring forth those fields, even now " white unto the harvest." With what patience and endurance and obedience has the animal kingdom resigned itself to its imperial master, and allowed its forms to be moulded and its intelligence guided for the comfort and convenience and necessity of man. Summer and winter, day and night, seedtime and harvest, come and go for us and our fields. By fire and water, by decay and change, by secret and hidden chemical process, by heat and frost, and by the vast mechanical powers of the revolving globe, are our soils prepared for our cultivation. The ingenuity of man exhausts itself for us. The wheel, the pulley, the lever, the centrifugal and centripetal forces, every curve and angle are brought into the construction of machinery to aid us in subduing a hard and obdurate soil, and in gathering in our crops. In nothing is the profound interest of man in the great art which feeds and clothes him made more manifest than in his constant endeavors to strengthen the hands of those engaged in it. The appeal to us is great. The good God opens his storehouse of land and sea and sky, and man dedicates his most cunning faculties—all that we may become intelligent and successful farmers.

FARMS.

ESSEX.

From the Report of the Committee.

The farm of Richard Webster, situated in Haverhill, west parish, having been offered for premium, was visited by the committee, on the 27th of August. Mr. Webster's statement which is appended, presents most of the facts connected with the purchase and the improvements made upon the farm. It will be seen that this farm is a small one, about forty acres being the whole amount included in tillage and pasture, and a considerable portion of this is still unreclaimed. The condition of the land prior to its passing into Mr. Webster's hands in 1859, was not very inviting, being poor and rocky.

What has Mr. Webster accomplished? His brief statement affords a tolerably clear idea of what has been done. A considerable area of his land is now under clean culture; the rocks are removed; portions are under-drained; the stone walls have been to a large extent rebuilt; orchards have been planted; pasture land cleared of bushes and stumps, and planted with corn and other grains. He has also erected a substantial and convenient barn during the past year, and the Committee found it well filled with hay and grain. The barn is admirably arranged with the view of affording comfort to stock, storing roots, as well as hay and grain, and saving manure. Mr. W. like all sensible farmers, makes a great point of economizing and increasing manures. The receptacle in the barn cellar for holding the excrement of his animals, is of brick, with cemented bottom; thus adapting it to retain the liquid as well as the solid portions. No point in successful husbandry is more important than this. The liquid excrement of an ox or cow, is actually worth more than the solid, as a fertilizing agent, and every ounce of it should be saved. A manure bin, like that of Mr. W's, below the stalls of a dozen animals, will, from its liquid condition, require the daily admixing of large quantities of chaff, muck, soil or peat, to act as absorbents; and the amount of active plant aliment thus secured, is surprising to those who treat their manures in the ordinary wasteful manner.

The Committee in the examination of Mr. Webster's farm, were highly pleased with the results of his labors. It was evident, however, that the work of renovation was but partially completed. The element of time must enter into all undertakings for the improvement of lands, and a few years more are required to place the farm in a condition to meet the society's requirements as a *premium* farm. There is much to be done in connection with lands immediately around the farm buildings. In the march of improvement, the fences, gates, drive-ways, &c., have not been reached. These will doubtless soon receive attention at the hands of the industrious and persevering owner, and the Committee cherish expectations that the time is not far distant when it will be a model farm, and entitled to the society's highest premium.

In view of the energy and intelligent industry displayed by Mr. Webster, resulting in so many farm improvements, the Committee award a gratuity of thirty dollars.

For the Committee,

JAMES R. NICHOLS.

Statement of Richard Webster.

The farm I enter for a premium, I bought in 1859, for $1,950, and it contains about forty acres. Fourteen of this was called field land; the remainder bush pasture, with alders, birches, &c., and about one hundred cords of oak, pine, and maple wood standing, and would pasture three head of cattle; and I wintered the first year I was on the farm—1860—one cow and horse, by buying about a ton of hay. Around all of the walls in the fields, was a margin of bushes from three to fifteen feet wide, being sprouts from oak, ash, cherry, and other stumps, which I had to dig out by the roots; and by many of the walls loads of stone had been dumped for the sake of convenience. In one field I hauled off over thirty cords; in other fields were a large lot of boulders, and I blasted about three hundred, around many of which were bunches of bushes growing. In one of my best mowing fields of four acres, I cut in 1860, less than three quarters of a ton of poor hay. The blasting has been done principally by myself, and required over seventy pounds of powder. When I commenced on this farm, I had no experience in farming, having spent my time previously mostly at mechanical pursuits, and went to farming on account of ill health. I had done no work of any amount since the spring of 1857, and was far from well when I began farming. I commenced a series of accounts with different crops to see which was the most profitable to raise, and have kept accounts on crops five years, and on farming up to the present time. The first four years' work, as will be seen by my expenses, was done at a loss, but since then there has been some improvement. My losses have been partly on experiments, of which patent manures have formed a prominent part, as I have tried all the different kinds which I heard recommended, from Pacific guano down to poudrette, which I found expensive experimenting, though it may be profitable in the end. In experimenting on crops I found out some things that did not correspond with views I heard expressed by those who claimed to be posted in farming, and very different from what I had myself supposed. To convince some of this, I have planted crops 'side by side in the different ways. I have labored under a great inconvenience sometimes in help, as it was a hard task to get the sleight-of-hand way of doing work as practised in some parts of Maine and New Hampshire, out of their heads. Some think it profitable to half hoe, half manure, and half do work generally, but I do not. I think it more profitable to take care of one acre well than to have two acres half taken care of. I have been over all of the farm thoroughly, taking out stone, under-draining, &c., excepting about twelve acres of pasture, which I intend to improve as fast as I can, taking up some each year. I have under cultivation about eleven acres this year, and cut from the balance of the field land (estimating 525 feet for a ton in bays,) some over thirty tons of hay, and have fed three horses with hay since June 26th. In expenses of farm, is reckoned taxes, interest, depreciation of stock, wear of tools, board of help, blacksmith's and other bills; and in income from the farm all crops, milk, labor done from farm by help, mowing, &c. I have set out 450 pear trees at a cost of $420, and 280 apple trees costing $75, and in 1865 built a barn at a cost of about $3,000, in which the saving of manure alone has paid the interest of it since it was built. In 1860, all I sold and harvested as shown by the farm account taken January 1st, 1861, amounted to $873.31, and expenses aside from building, were $464.25. My crops were mostly corn, potatoes and grain. The same year I built a house at a cost of $550, and a granary which cost $150. In 1861, I sold from the farm the amount of $652.33, and my expenses were $688.33. In 1862, I sold from the farm the amount of $693.67, and my expenses were $834.16. During this year I built over most of my line walls, put in under-drains, cut bushes, &c. In 1863, I sold $1,115.80, and my expenses were $1,083.80. In 1864, I sold $1,945.50, and my expenses were $1,371. In 1865, I sold $2,274.16, and my expenses were $1,763. This year I built my barn, and we had considerable extra work in digging cellar, hauling stone, lumber, &c., besides working on the farm. In 1866, I sold from the farm $2,595.83, and expenses were $1,647.70. This year, 1867, my crops are not as good as in years previous, but prices have been better, so that my sales will not be far from what they were last year. What the farm is worth now, I could not exactly tell, and as it is not for sale, I do not wish to set a price upon it, but others call it worth all the way from $5,000 to $8,000.

WORCESTER NORTH.

From the Report of the Committee.

There was but one farm entered for our inspection, and that was by Cyrus Kilburn, of Lunenburg. On the 26th of June the Committee visited Mr. Kilburn's farm, and found him engaged in his hay field, as he thinks his earliest cut hay is the most valuable for making milk. His farm contains 122 acres, about twenty of which is woodland. His crops were looking well, and had been well tended. One acre of winter wheat upon land broken up the previous August, and upon which he spread sixteen loads compost manure and one hundred and fifty pounds phosphate, gave promise of a large yield. He has been very successful in raising winter wheat, and thinks it worth ten per cent. more than spring wheat. For corn he spreads his manure and applies two hundred and fifty pounds phosphate to the acre in the hill, and intends to put just twenty-five hills to the square rod. He has some low land subject to early frosts, upon which he raises buckwheat, and considers it a valuable grain, particularly for fowls. He has a large amount of muck, which he uses in various ways for manure, and thinks it valuable. One feature in Mr. Kilburn's farming is worthy of note. He has kept no swine for five years, thinks it costs him twenty cents per pound to make pork, and that the refuse from the kitchen pays much better when fed to poultry. He has six swarms of bees, and one spring took from his hives two hundred pounds of nice honey. Mr. Kilburn is a working man, and although threescore and six years old, is full of enthusiasm for the future, and we think him one of the men who make farming pay.

We also called on Mr. Simon Black, who has a farm of 112 acres not entered for premium, but by request we visited it; and although it has been in his possession only about three years, he has made some valuable improvements. He thinks he has doubled the capacity of his pastures by the use of plaster, and the appearance of his ten cows showed that it was a paying operation. He has also improved his low grounds by ditching, ploughing, removing stones, pulling willows and top-dressing; and the Committee think that if his zeal for improvement does not abate soon, he will be under the necessity of providing more barn room in which to store his crops. His cows are stabled at night, and as he uses sand for an absorbent, they are comparatively clean. They were looking well, and some of them had the appearance of being deep milkers. On the 4th of October we again visited Mr. Kilburn, and found that his acre of winter wheat, (by the estimation of the committee on grain,) yielded thirty-four bushels, and the grain, as we examined it in the bin, appeared to be a first-rate article. His corn was most of it cut and stooked in the field, which he thinks is much the best way, and usually gets from sixty to eighty bushels of shelled corn to the acre. He is making some experiments in topping corn, and also stripping off the leaves, which we hope the society will get the benefit of at some future day. He raises no roots for his stock—thinks it does not pay. He keeps sixty hens, and realizes a profit of two dollars each annually. He keeps no account of the total sales from his farm, but from the proceeds of the same pays for his labor and other necessary expenses, and is constantly making improvements upon his farm. We accordingly recommend that the first premium of $25 be awarded to Mr. Kilburn for the best cultivated farm.

ABEL F. ADAMS.
NATHAN UPHAM.
THOMAS BILLINGS.

IMPROVING PASTURE AND WASTE LANDS.

ESSEX.

From the Report of the Committee.

The Committee on Improving Pasture and Waste Land have had no entry for the former, and but one for waste land—that of Richard Webster, of Haverhill.

Three of the Committee visited this piece of land in September, and were pleased with the improvement made upon it. It will be seen, by the statement of Mr. Webster, that he was liberal in his expenses, having spent over twelve hundred dollars for labor, seed and manure on less than three acres, in three years; but large as the expenditure was, the income was still larger. We have looked at the amount of sales from this piece for the three years with some care. It will be seen that the prices were the highest retail ones, so that he must have carried them to the consumer. He was fortunate in having a large part of it planted with potatoes in 1864, which he sold for $430. Again, in 1865, he was fortunate in having so many squashes when they sold high. In 1866 his crops appear to have been much larger, but his sales were not so great. He has not given us any estimate of the expense of marketing the crops. In the balance which he has struck, it appears that he has made $965.15 by his operation. The Committee think that twenty per cent. should be deducted for marketing; and if we leave out of the account the $350, the estimated improvement of the land, we shall have about $350 gain.

Mr. Webster says that he was not bred a farmer, but he appears to have the faculty of disposing of his produce well. It is pleasing at the present time, when so many are disposed to live between the producer and the consumer, to find one who deals directly with the consumer. The Committee would award to him the first premium of $15.

For the Committee,

WILLIAM R. PUTNAM.

Statement of Richard Webster.

ACCOUNT WITH PASTURE LOT NO. 4.

1863.		Dr.
To labor, ploughing, &c.,	$26 25	
turning sods at odd jobs,	10 00	
		$36 25
1864.		
To harrowing, digging out roots, hauling off stones, &c.,	$15 00	
furrowing, dunging out and planting,	35 00	
30 bushels potatoes for seed,	30 00	
6 quarts corn,	60	
15 cords manure,	110 00	
hoeing, &c.,	40 00	
harvesting,	38 00	
interest and taxes,	15 00	
ploughing in the fall,	18 00	
digging out bushes; stone and underdrain,	100 00	
		401 60
1865.		
To ploughing and harrowing in spring,	$18 00	
furrowing, dunging out and planting,	30 00	
20 cords manure,	160 00	
hoeing and weeding,	42 00	
potatoes, corn, squash, pease and tomato seed,	20 00	
interest and taxes,	17 00	
ploughing and draining in the fall,	75 00	
harvesting,	35 00	
		397 00

1866.		
To ploughing and harrowing in spring,	$18 00	
17 cords manure,	170 00	
furrowing, dunging out, planting, &c.,	40 00	
corn, cabbage, squash, pease, beans, for seed,	18 00	
hoeing, transplanting, &c.,	45 00	
interest and taxes,	18 00	
harvesting,	30 00	
ploughing, harrowing, brushing and rolling land and grass seed,	28 00	
labor in getting out stone,	25 00	
70 pear and 60 apple trees,	90 00	$482 00
1867.		
To labor cutting and getting in hay,	$10 00	
interest and taxes,	20 00	
picking stone, hoeing, manure, seed, &c.,	40 00	70 00
		$1,386 85
2⅞ acres land, worth, 1863,		120 00
		$1,506 85
1864.		Cr.
By 50½ bushels potatoes, $3,	$150 00	
350 bushels late potatoes, 80 cents,	280 00	
20 bushels corn, $1,	20 00	
early corn,	15 00	
fodder and turnips,	20 00	$485 00
1865.		
By pease sold, and seed,	$45 00	
tomatoes,	90 00	
6¼ tons squashes, $60,	370 00	
170 bushels corn in the ear,	150 00	
2½ tons fodder,	20 00	
125 bushels potatoes,	105 00	
⅓ acre fodder corn,	15 00	795 00

1866.		
By 180 bushels potatoes, 60 cents,	$108 00	
8½ tons squashes,	255 00	
sweet corn sold,	105 00	
cabbages sold,	160 00	
pease and beans,	22 00	
turnips,	12 00	
		$662 00
1867.		
By 3½ tons hay, estimated,	$70 00	
carrots, beets, tomatoes, &c., estimate,	75 00	
		145 00
stone hauled off,	$25 00	
2⅞ acres land, worth,	350 00	
		375 00
		$2,462 00
Dr.,		1,506 85
Balance,		$955 15

This piece of pasture land was as rough as any on the farm, being mostly overgrown with alders and birches; the balance with huckleberry bushes, and all more or less covered with stone, some one hundred and fifty being necessarily removed by blasting. It is now all under-drained with stone drains, three and a half feet below the surface and about eighty rods in extent.

RECLAIMING SWAMP LANDS.

MIDDLESEX SOUTH.

Statement of I. V. Adams.

The acre of improved meadow which I enter for premium, is a part of a seven acre lot which I purchased in 1864, at a cost of seventeen dollars per acre. It is also a part of Little Cedar Swamp, a tract of two hundred acres of swamp land upon which certain improvements were made in 1862–3 by a board of commissioners appointed by the superior court of Middlesex

County. As the improvements made by them have been fully described in the published transactions of this society, and also Secretary Flint's Report of the Agriculture of Massachusetts I will not repeat them here but will enter at once upon an account of the improvements for which this lot is entered for premium.

In the spring of 1864, the owner of an adjoining lot set fire to his land, and the fire getting beyond his control, extended to my land and burned over about one-half of this acre. In the autumn of the same year I had a ditch dug on each side of the piece, and as the ditch is of equal benefit to the adjoining lands, I have charged only half of its cost to this experiment. In June, 1865, I harrowed the portion which had been burned over, furrowed one way and planted with potatoes. I did not plough nor manure it. I hoed them only once and that without ploughing or cultivating. When I dug them the peat was so dry and light, that I could paw them out of the hills with my hands as though they were covered with saw-dust. That part of the lot over which the fire did not extend was covered with a growth of flags and bushes and its surface was very uneven there being many places where water would always stand after a heavy rain. I cut the brush and tore up the flag-roots and other tough places with a hand puller, cut off the bogs with the bog knife and filled up all the holes with mud which had been thrown up from the ditch. I ploughed and harrowed the tough spots until they were well loosened, the turf was then allowed to dry for a few days and then burned; it was then harrowed and burned again. After taking the crop of potatoes from the other part I spread the potato vines on the ground and burned the whole lot again. These repeated burnings left the surface level and in a good condition. The following winter I carted on one hundred and twenty-five loads of twenty bushels each, of coarse sand, and spread it evenly over the surface; the expense of carting and spreading the sand was twenty cents per load. In the spring of 1866, I harrowed the piece thoroughly so as to get the sand well mixed with the peat, and sowed a portion of it with barley and the balance with oats, sowing twenty quarts of grass seed with the grain. The grain did not fill out very well and I cut it early for fodder of which there were two tons. Upon taking off the grain crop it appeared that the grass-seed had taken much better with the barley than with the oats, and this difference was quite apparent up to the present season. The seed took with the oats, however, as well as it usually takes upon the uplands. During the fall of 1866, I cleaned out the ditches which had been filled up by constant washing from above with a mixture of sand, ashes and peat, which I considered worth more than enough to pay for throwing it out and carting it away. In the spring of 1867, I sowed three bushels of plaster and two bushels of salt upon this lot, and this is all the fertilizing it has received. The crop this season was two tons of good English hay, which I cut August 1st, mowing and raking with horses.

EXPENSES.

1864.	One acre of land,	$17 00
	One-half cost of 40 rods ditch,	6 67
1865.	Harrowing and furrowing,	1 50
	Six bushels seed potatoes,	4 50
	Two days planting,	3 00
	One day hoeing,	1 50
	Two days digging potatoes,	3 00
	Three days with team ploughing,	9 40
	Three days burning at $1.50,	4 50
1866.	Carting 125 loads sand at 20 cents,	25 00
	One harrowing and bushing,	3 00
	Two bushels seed oats,	1 50
	One bushel barley,	1 25
	Grass seed and sowing,	2 50
	Three days getting hay,	4 50
1867.	Plaster and salt,	2 75
	Applying the above,	33
	Three days getting hay,	4 50
Interest and taxes,		4 00
		$100 00

PROFITS.

1865.	Sixty bushel potatoes at 70 cents,	$42 00
1866.	Two tons green fodder,	40 00
1867.	Two tons good hay,	50 00
	One acre of land,	100 00
		$232 00

ORCHARDS AND FRUITS.

MIDDLESEX.

From the Report of the Committee.

The Committee on Orchards has to report only one entry, and that made by Capt. George Pierce, of Arlington, who entered his apple orchard.

A visit was made to his orchard when the harvest of the Williams apples was being gathered. The trees were nearly all loaded with fruit, which consisted of Baldwin, Hubbardston, Porter, Williams, and a few other varieties. The Baldwins were loaded down with fruit; the Hubbardstons and Porters with fair crops, while the Williams had been about half gathered.

By reference to the detailed statement of sales herewith annexed, it will be seen that this orchard of less than five acres has yielded its owner the past season over three thousand dollars for fruit and vegetables. Nor is this all. We were told by the exhibitor that he had gathered fair crops every year for the last five years, while very few orchards had yielded any fruit in this county.

The first thought was, How is this done? Nothing in the soil or location would seem to indicate this to be more favored than hundreds of other orchards. In reply to the question, Capt. Pierce says, "I have taken care of it." If that is the only answer, it would be well to inquire what he means by "taking care of it." By his statement, it will be seen that the land has been kept in tillage for the last thirty years. His method has been to dress broadcast every second year, not extravagantly, and to manure in the hill every year with the best manure. It was plainly manifest that he had cultivated with skill and care. He had not allowed any weeds to grow, and his squashes were planted only in the open spaces, and covered only a small part of the ground. All the trees that had fruit were well mulched with meadow hay, thus keeping the ground moist by preventing evaporation, keeping the weeds down, and saving the dropping fruit from harm. So valuable did he think this, that he would do it "if the hay should cost forty dollars a ton."

From what we saw of the orchard, we should not think a large amount of labor had been bestowed upon it. It did, however, manifestly appear that careful and skilful hands had done the work. This was seen in the neat and clean cultivation, in the well-shaped trees, and in lack of dead or diseased limbs or bad, unhealed wounds.

In gathering the Williams apples, none were picked from the trees; all were allowed to drop. Larger or fairer fruit is seldom seen. It was duly appreciated, as will appear by reference to the account of sales annexed.

The question still comes to us, Why has this orchard such harvests, while most others have borne little or no fruit? Have not other orchards been as well located, and as well cultivated, that have yielded no fruit? As regards cultivation, we think not; at least not every year, as this has.

The winter of 1863 and 1864 was very cold. Most of our apple-trees were injured by it. The two following summers were very dry. Very little new wood was made by our trees. Although we have seen our trees blossom, we have had little or no fruit; and this, as it seemed, for want of vital force in the trees. If the trees were examined during that period, it was found, by cutting off limbs, that a very small amount of sap-wood (alburnum,) was formed. The sap-wood formed previously appeared yellowish and not in a normal condition. As the sap flows by endosmose, and only, or nearly only, through the sap-wood, we may well imagine extreme cold to so freeze the cells as to destroy or greatly injure the power of endosmose. If, after being so injured, we may also see the importance of giving the tree, by cultivation and a proper supply of moisture, all the assistance to make new sap-wood as soon as possible. The writer has not unfrequently seen young apple and pear trees so injured by the cold of winter, that, although a considerable growth of new wood had been made, the tree would break down by a little bending, and the old sap-wood would be found entirely rotten, proving, as we think, that the functions of the cells had been destroyed by the severe freezing. If this theory is correct, we think we may account for Capt. Pierce's success in cultivation.

We have awarded to Capt. George Pierce, of Arlington, the society's premium, $12.

For the Committee,
JOHN CUMMINGS, *Chairman.*

Statement of George Pierce.

The orchard which I present to you for premium comprises five acres of land. The younger part contains eighty-seven trees, which have been set fifteen years, and have been in bearing about eight years. Thirty-eight of the trees are the Williams variety, and the remainder are miscellaneous varieties. The older part contains about sixty trees, which are about thirty years of age. Most of them are Baldwins and Porters.

The soil is a sandy loam, and the subsoil is light and sandy. My mode of cultivation is a thorough ploughing in the spring and fall, and a thorough cultivation through the summer. I spread on about five cords of stable manure per acre every other year. The ground is planted mostly with squashes, which are manured in the hill with two shovelsful of as good manure as I can get to each.

My mode of pruning is to cut out all the superfluous limbs and suckers. Where one limb crosses or rides upon another, I invariably take it out. I do not hesitate to prune at any time of the year, but never cut in close except in the latter part of May or the first of June, when I re-cut all the limbs that have been cut at other seasons of the year, and were left two or three inches in length, as the sap is in active circulation then, and the healing process goes on more rapidly.

I make it a chief point to keep the trees clear of all caterpillars, canker-worms, and other vermin. I have contended with the canker-worms for twelve years, and by so doing I have been able to get a good, fair crop of apples during the whole period.

Account of the Product of the Orchard of George Pierce, in Arlington, for the year 1867.

217 bushels of Williams apples, sold for . .	$827 00
78 bbls. of Porter apples, sold for . . .	300 64
87 bushels of Hubbardston Nonesuch, . . .	145 00
207 bbls. No. 1 Baldwin apples, ...	716 50
45 bbls. No. 2 Baldwin apples, ...	101 54
26 bushels miscellaneous varieties, . . .	39 50
93 bbls. cider apples, ...	136 00
99 bushels pears, different varieties, . . .	172 95
	$2,439 13

Marrow and Hubbard squashes, raised on the ground,	$415 61	
Potatoes, beans, pease, cauliflowers, &c.,	250 80	
		$666 41
		$3,105 54

Arlington, September 1, 1867.

CULTIVATION OF THE PEAR.

MIDDLESEX.

From the Report of the Committee.

The cultivation of the pear is engaging more and more the attention of the orchardist. Bearing while yet quite young, and easy of culture both on the quince root and the pear, it is peculiarly adapted to small gardens, and will bear frequent removals, if necessary, without harm, if not even with benefit; so that all may have them, since they may remove them as easily as their household goods.

Pears prefer a *strong*, *moist* and *rich* soil; but they may be made to thrive on any soil, not too dry, by aid of high cultivation and *plenty of manure*. No fruit requires so high feeding, and very few will bear it without harm.

Shelter is of great service to the pear, which always thrives better in a still atmosphere. Its leaves are very tender, when partly grown, and are bruised by high winds, and sometimes destroyed by them. Some few kinds do better in a warm, sandy loam; but they are the exceptions to the rule, and it is generally found, in such cases, that their birthplace was in such a soil.

The show of pears was very fine for the season, which has not been favorable to the ripening of this fruit to its usual good quality. Indeed, all fruits are this year flat, insipid, or acid beyond all account. Still, those shown by John R. Poor, of Somerville, Davis & Bates, of Cambridgeport, Warren Heustis, of Belmont, Jacob Eaton, of Cambridgeport, and others, were particularly handsome and large.

Mr. Edward Kendall, of Cambridgeport, exhibited superb specimens of Dix, Doyenne Comice, and Swan's Orange, and John N. Merriam, of Cambridgeport, also showed very fine pears and apples, but too late to compete for the premium, as they did not reach the exhibition until afternoon.

The Committee regrets this, and also that it had no gratuities placed at its disposal. It can only express its obligations to the gentlemen for aiding the exhibition with their fine specimens.

Warren Heustis, Belmont, says his pears are grown on a good loam, with clay bottom; uses hog manure; trees six feet apart; thinks they should be at least twelve feet apart; trees on quince root, but have made roots from the pear, and are likely to become standard trees.

Paul Harris, Lincoln, says his trees are standards on a light, sandy loam; cropped with roots; manured with twenty-five loads compost to the acre, and ten quarts of ashes to each tree.

Davis & Bates, Cambridgeport, grow on a gravelly soil; use stable manure *fall* and *spring;* never allow any weeds; think good cultivation the main secret of success.

Jacob Eaton, Cambridgeport, grows on a black, marshy soil; top-dresses in autumn with horse manure.

Milton C. Walker, Lincoln, top-dresses in autumn with meadow mud and bone dust.

Edwin Wheeler, Concord, plants ten by seventeen feet; manures annually; crops with roots; soil heavy.

A. C. Collier, Concord: soil, light, sandy loam; manures in spring with night-soil.

J. R. Poor, Somerville: soil, clay loam well trenched and manured; keeps the fruit in a dark, dry and cool room.

George S. Paine, Concord: strong, moist soil, under-drained and worked ten inches deep; top-dresses annually with a compost of stable manure and meadow mud.

Thomas F. Hunt, Concord: trees on the quince root; trenches one and one-half feet; top-dresses yearly with stable manure.

For the Committee,

E. W. Bull, *Chairman.*

FRUITS.

FRANKLIN.

From the Report of the Committee.

THE ANTIQUITY OF THE APPLE.

That the forbidden fruit of Paradise was an apple, we think is commonly believed, but as the belief rests upon no certain evidence, other valuable fruits, such as the fig, the peach and the pomegranate, have each found their advocates as the kind of fruit that had the honor—or dishonor—of being the instrument of the introduction of evil into our world.

Whatever the truth may be in this matter, the apple is frequently mentioned in Scripture and in ancient history. Alexander the Great, we are informed, was exceedingly fond of this fruit, and found in the country around Babylon the finest apples he had ever seen.

The apple was held in such high esteem with the ancient Greeks, that in some of their celebrated games, apples constituted the only prize awarded to the victor. What would be thought of a committee of award in our agricultural society that should award as a premium for the best article exhibited a bushel of apples ?

Among some of the ancients the gift of an apple had a tender signification, being a symbol of affection. The historian Gibbon relates that the Emperor Theodosius caused one of his distinguished subjects to be put to death for receiving an apple from his Empress Eudocia.

The apple has acquired great celebrity in some of its historical associations. The thrilling story of William Tell shooting an apple from off the top of the head of his son, has often been recited as an interesting incident in the history of the republic of Switzerland ; and the fact that Sir Isaac Newton, the renowned English philosopher, in seeing so common an occurrence as an apple falling from its branch to the ground, was led to give the matter such attention as to discover from it the great law of gravitation, has often been narrated.

MULTIPLICATION OF VARIETIES.

Such attention has been given to the cultivation and perfection of this valuable fruit, that, while the number of varieties, which at the commencement of the Christian era is believed not to have exceeded twenty, had increased in 1650 to five hundred kinds, there are at present classified in the published catalogues two thousand five hundred different varieties, and never, perhaps, have the varieties multiplied so rapidly as during the present generation.

THE BEAUTY OF THE APPLE.

In all the floral kingdom, where can be found a more beautiful sight to behold than an apple orchard in full bloom—each blossom perfect with its delicate shades of coloring, and the whole grand mass of blossoms forming a perfection of beauty which a maiden's cheek well might covet, and wasting its sweet fragrance upon the gales of spring-time.

And when the season of the ingathering of the fruit returns, what beautiful tints of crimson and gold—of pink and green and russet—of mottled, striped and spotted with every rich and beautiful hue! What can excel the feast they offer to the eye, unless it be the rich, juicy flavor which they bring to the taste?

USES OF THE APPLE.

But the beauty of the apple will not, with the generality of cultivators of this fruit, bear a comparison with its economic value in the multitude of uses in which it is found so exceedingly desirable. It is, when fully ripe, an excellent preventive of disease, and its value in this respect is becoming better appreciated, and it is also not without its important curative varieties. It would seem to have been provided by nature as the chief one of those fruits intended to supply the system with some of those elements so necessary for its healthy condition. What multitudes of invalids have found comfort, invigoration and strength in a roasted apple!

In all the circle of fruits in our climate, perhaps none are preserved in their natural condition during the whole year with so much ease as the apple, and this quality of its being comparatively so imperishable, adds immensely to its value; while the great variety of berries—the peach, plum and grape—are very valuable in their season, the apple is in use almost the entire year.

CULTIVATION OF THE APPLE.

The cultivation of the apple has increased so much during the last ten years that many have anticipated a superabundance of this fruit.

If all, or even a good proportion of the apple-trees which are transplanted received proper cultivation and care, this might occur. But the work of setting the trees is so often done in a careless and improper manner, and the young trees in so many instances perish from neglect, or from the browsing of cattle or other causes, and the market on the other hand is so rapidly extending, that we apprehend there is little to fear in that direction.

Very great progress has been made in the cultivation of nurseries during the present generation. The writer remembers that when about thirty years since his father wished to purchase some twenty-five apple-trees for transplanting, he was unable except by much inquiry to find them, and when found it was but a small, uncared for patch of ungrafted trees in an adjoining town. Now, excellent nurseries of all kinds of fruit and ornamental trees are abundantly at hand, some of them so extensive as to cover hundreds of acres.

In regard to the manner of cultivation from the time of transplanting onward, very much might be said, but as very excellent directions are given in the fruit books now before the public, we will only make some general observations upon that subject.

1st. How far apart should apple-trees be set?

We think thirty feet plenty near enough and two rods about right, and if set in regular rows it adds greatly to the beauty of the orchard and to the convenience of cultivation, &c.

2d. We think that some kind of litter kept under a tree to cover the roots, and prevent the earth from drying up the first summer after transplanting, very important—much better and easier than watering.

3d. Apple-trees need examining at least once a year to cut out unnecessary branches, thereby preventing the top from becoming an unsightly jungle of brush. Let a saw be used instead of an axe in trimming; cutting off the branch smoothly that the wound may soon heal.

We consider any season of the year better for pruning than March and April—the time when it is most commonly done, at which time the sap flows freely from any wound which is made, to the great injury of the tree.

PROFITS.

Aside from the great convenience and pleasure of having a succession of good apples in their season, a surplus may readily find a market either for feeding to stock if very plenty, or for cooking and eating. As the population in our cities and manufacturing villages is constantly increasing, and at the same time the value of the apple becoming better appreciated, the demand for it increases with the production.

For the past three years, owing to a short supply, apples have sold readily at from four to six dollars per barrel. Those orchardists who have been so fortunate as to have apple-trees under their care that were only moderately productive, have received from them a handsome income. Even the poorest and knottiest specimens are worth at the present writing sixty or seventy cents per bushel for making cider.

An important question concerning the cultivation of this fruit is, What kinds shall we cultivate?

We think it not desirable to multiply varieties greatly. A few of the approved varieties of each season are far better than a large number of kinds of second or third rate fruit. The following kinds have been proved and found valuable for this vicinity, viz:

For summer—Early Harvest, Red Astrachan and Golden Sweet.

For fall—Porter and Gravenstein.

For winter—Hubbardston Nonesuch, Rhode Island Greening, Baldwin and Roxbury Russet.

BERKSHIRE.

From the Report of the Committee.

No fruit shows greater improvement under careful cultivation, nor pays better for such cultivation, than the pear. Pliny speaks of the pears of his time as astringent and indigestible, only fit to be eaten when cooked, and we still have native fruits answering to this description, but most of our cultivated pears are the perfect antipodes of those of the old Roman, and well deserve the epithet of beurre or buttery. They fairly melt in the mouth. We never were privileged to taste of ambrosia, but we doubt whether this fabulous food of the gods could bear a comparison with our modern pears. This great improvement is the result of careful propagation from seeds, and to Knight in England and Van Mons in Belgium, we are indebted for bringing this fruit to its present state of perfection. There is a margin for greater improvement, and Mr. Foote of Williamstown, exhibited in his large collection at our fair, some seedlings of the Seckel which certainly equalled the parent in flavor, and in size and buttery quality were superior. If some one will turn his attention to the production of a summer pear of high order, and give us something which will answer in this latitude for August, as well as the Bartlett does for September, he will prove himself a public benefactor. A good early pear is still a desideratum. The Bloodgood, Doyenne d'Ete, and indeed the whole list of our first ripe fruits are small in size and rather insipid in taste. The Dearborn seedling is the first really good pear that we have, and this is not in perfection with us till the first of September, and is too small for a good market fruit. We desire, however, in passing, to bear testimony to the great hardiness and exceeding fruitfulness of the Dearborn, and cannot too highly recommend it as well adapted to our Berkshire climate. Planted by the side of the Seckel and Flemish Beauty, it shoots far above them, although bearing early and profusely.

The pear loves a deep loamy soil and high cultivation. The difference in size and flavor of specimens grown in favorable and unfavorable circumstances is truly remarkable. The pear has a delicate organization, and will not bear neglect as well as its coarser-textured cousin, the apple. Mineral manures add greatly to the quality of pears. The late G. P. R. James, while occupying the Ashburner place in Stockbridge, which is well stocked with this fruit, found the trees inclined to be drooping, and the fruit to crack, and restored health to the trees and fruit by the free use of copperas (sulphate of iron,) so that this is now one of the most productive pear orchards in the county. The refuse of a blacksmith shop or an iron foundry is just the food the pear-tree loves. Sulphate of lime (gypsum,) is one of the cheapest and most efficient manures for the pear. Wood ashes, however, contain the greatest variety of mineral matter, and cannot be too carefully treasured for the use of this as well as other fruits. When these ashes are leached, their virtue is not so much exhausted as is generally supposed. The phosphate of lime, one of their most valuable constituents, is insoluble in water, and therefore remains intact.

The past summer has not been favorable for the perfect development of the pear. The trees blossomed and fruited bountifully, but there has been an unusual tendency to crack, and the want of flavor has been noticed in all parts of the country. The cracking of the fruit is the most alarming fact in pear growing. The Flemish Beauty and even the hardy Seckel have this year suffered much from this malady. As to what is the cause of this disease the P. D's (Pyrorum Doctores) disagree, "and when the doctors disagree who shall decide?" Whether it is the result of atmospheric influence or some defect of the soil, is not determined. The subject deserves careful investigation, and our agricultural societies cannot offer a premium for a more valuable object than a remedy for this disease.

PLYMOUTH.

From the Report of the Committee.

No crop within our limits has suffered more from the wetness of the season than the pear. The fruit did not set well. When small and tender it became spotted and blotched with a fine mould which destroyed much that remained; and later in the season many kinds began to crack and grow distorted. When not more than half grown, leaf-blight appeared; and some trees were as destitute of foliage in August as they usually are late in autumn. The display of pears, however, was creditable as a whole, and particular varieties were of fine size and quality. The Bartlett, not usually seen at our exhibitions, was well represented. The Sheldon, Lawrence, Noveau Poiteau, Doyenne du Comice, and Beurres Easter, Clairgeau and d'Anjou, with others that might be named, were beautiful specimens of their kind, suggestive to those who are reluctant to venture beyond the Bartlett and Flemish Beauty, of what may be done by any one who has a piece of ground sufficiently large to set a few trees and enterprise to cultivate them. We hail with pleasure the fact that a large number are planted annually, for, notwithstanding the enthusiasm of some has been checked by their failure to realize all they expected in the culture of this noble fruit, it has proved, in many localities, a more constant bearer than the apple. That it needs higher culture is the uniform testimony of those who have been most successful. It is well known that Mr. Stetson always raises fine pears. His gardener informed a member of the Committee that it is his custom to place a wheelbarrow load of well-rotted manure, which has been used in the hot-bed in the spring, around each tree in the fall. The following spring it is worked into the ground. This generous treatment, continued from year to year, secures a certain result.

The Committee offer the following suggestions to those about to plant gardens or orchards :—

1. If your ground is not what it should be, *make it so.* Let it be under-drained, naturally or artificially, deeply worked and thoroughly manured.

2. Plant no more trees than can receive the best attention, and select such varieties as have secured a reputation *in your own vicinity*, reference being had to their bearing qualities as well as general excellence ; for it is more encouraging and profitable to have an abundance of good fruit than little that is best. Buy *good* trees, of a *responsible* person, and *set them well.*

3. Prune annually, to give *shape* and *strength* to your trees, and suffer them to bear no more fruit than they can sustain without propping or help of any kind.

Without the pure light and heat of the sun really good grapes cannot be raised, and they have not ripened well the present season. Even those grown under glass have failed to come up to the usual standard of excellence. There was but one collection entered—that which received the first premium. In the small lots of others, the Black Hamburg and Barbarossa were best developed. Of the natives, the Concord took the lead in this respect. A lot exhibited by Ramsdell & Packard attracted most attention. Seven bushels, as good as the sample, were taken from eighty vines, three years old. B. W. Keith, who was the largest exhibitor of natives, says his first choice is the Concord; second, the Hartford Prolific; and, third, the Delaware, which, with him, ripens a week earlier than the Concord. both having the same aspect. Dr. Puffer, who has given considerable attention to the Rogers' grapes, says they do not mildew; and he regards No. 3 with most favor. The Concord is a grape of great promise, and it is safe to plant it. It does not need as high culture as most varieties. The same may be said of the Hartford Prolific; but it has the bad habit of dropping its fruit. The Delaware is very small, but of fine quality. The Isabella and Catawba do not ripen except in sheltered situations and favorable seasons. Those who plant or rely upon wild grapes, cannot have compared them with the best improved natives.

It was a pleasant sight to many eyes to see peaches which were grown in the open air on the tables of the society. So seldom is this delicious fruit on exhibition, that no premium is offered it. The Committee adjudged the exhibitors deserving of gratuities. The disappointment which attends all attempts to raise peaches with regularity, suggests the propriety of trying an experiment, which, we learn, has been attended with success. Plant trees in pots or tubs, say twelve inches broad and deep, with an orifice in the bottom at least three inches in diameter. Set them in a part of the garden which has a good exposure to the sun, six inches deep in the ground. The soil should be well prepared and the trees occasionally watered with liquid manure. Take up the pots about the middle of November, cutting off the roots which have pierced through the orifice, and set them in a place in the cellar of pretty uniform temperature, where they are to remain until it is time to set them out in the spring. Trees treated in this manner are said, on good authority, to bear well; and fifty handsome peaches have been taken from a single one. To those who pursue the ordinary course of cultivation, we say: select the best trees, plant in warm situations, and take every precaution to exterminate the borer.

So far as we are able to judge, the crop of quinces diminishes annually, and there is a proportionate increase of price. They have sold the present season for four and five dollars per bushel. The borer has been allowed to make sad havoc with the bushes in many gardens, and few are planted to replace those that die out. Desirous to give encouragement to exhibitors, the Committee awarded gratuities.

The different varieties of cranberries were well represented, as usual, and we do not remember to have ever seen any larger or more beautifully colored than those which received the first and second premiums. We advise those who contemplate the improved cultivation of this fruit to obtain plants of Messrs. Hunt & Stetson.

In concluding their report, the Committee wish to call the attention of the executive officers of the society to the wholesale destruction of birds' eggs which is annually carried on to such an extent as, in the judgment of many, to call for legislative interference. Intelligent observers concur in saying that many useful birds are diminishing in numbers, while insects which prey upon vegetation are increasing. In some parts of the county much of the fruit is stung, and kinds that were not molested ten years since are now seriously injured.

For the Committee,

P. LINCOLN CUSHING.

MARTHA'S VINEYARD.

From the Report of the Committee.

The kinds of fruit designed to furnish the principal topics for this report, are such as are on exhibition. Still a passing reference to a few kinds whose times of ripening do not allow them to appear upon our tables, may not be out of place. Some of these, if not all, may be classed under the head of garden fruit; yet simply naming them may not be regarded as a trespass committed upon the particular province of another committee. Among the sorts which may be mentioned are the raspberry and the blackberry. Of the former, which is a very palatable fruit, choice specimens might be cultivated in our garden lots. To preserve and perpetuate the vines some care is needed, but in the gathering time none will regret the painstaking. With regard to the blackberry, although it grows spontaneously in the fields and by the roadside, and is thence supplied to the market, yet those of us who live in the villages would find it a very convenient thing to cultivate a few good vines of the taller species by our garden fences, whence we could gather fruit fresh for use. One member of your Committee, and perhaps others, can speak from experience. The strawberry none will forget. Of shrub fruit, none can be more easily cultivated, and none more fully repays the labor bestowed, than the currant. The shrub can be grown in any amount from *cuttings*, and once fairly started, a little pruning and light dressing annually will insure an abundant yield. Of plums, there are some delicious species, but the trees are not so easily brought to maturity as some others, and when mature their years for bearing are apt to be but few. Still, every considerable fruit-grower does well to have a few good varieties, such as the Italian Damask and the Green Gage.

Children all love to sing "Cherries are ripe," and usually children of a larger growth are not backward about picking them. If you can keep the robins away till you get your share, a nice Tartarian, or even a ripe Red, will not burn the tongue of the eater if it do not quite melt upon it. The cherry is the fruit of the prune or plum kind, the original stock of which is the wild cherry. One author says, "The best kinds are the May-Duke, White-heart, Black Tartarian, Honey-heart, and Black-heart cherries." The cherry was first brought from the southern shore of Turkey in Asia, about two thousand years ago. The tree needs but the well adapted soil and a little care to insure success.

From these hasty glances, your Committee pass to the pleasant task more especially assigned to them. They have however felt, that, to be true to their trust, they should seek to be useful. They were not satisfied simply to assign premiums and gratuities to the producers of the specimens which load your tables; they wished to ascertain and tell something about the growing of these fine samples. And then, as, owing to the lateness of the season when our fair is held, many of the choice varieties of some kinds of fruit, if not of all, cannot be preserved for exhibition, it follows that a much greater number of varieties share the attention of our people than perhaps any of us have supposed. Then, again, it is of interest to all who would raise fruit to know what are regarded by the larger growers, who have made it somewhat of a business, as the varieties best adapted to our soil and climate. In order to gain and shed some light upon these topics, pains have been taken within the last few months to see or correspond with some of the principal fruit-growers on the island, and gather from them such facts as were supposed to be of utility. The chairman has also been in communication with some few gentlemen of large experience abroad.

Although there are certain varieties both of trees and vines which are very sure to be found in the lot of nearly every grower—small growers as well as large ones—yet there is not perfect accord as to the superior quality of all of them. These slight differences of opinion doubtless arise in part from varieties in soil, and partly from differences in position as to shelter by means of buildings, hills, or shelter trees. Abating these circumstances, there is very general agreement as to the best varieties.

THE QUINCE.

This fruit is said to require a climate neither too warm nor too cold. And it has been demonstrated by experience, your Committee think, that our island climate is just that which is best adapted to its successful cultivation. Our soil is also of the right kind. Some of the best produced on our soils last year brought $12 per barrel. It has been estimated by one of our larger exporters that about $3,000 worth was sold from the island last year, besides the many consumed here. The tree, as is well known, is easily cultivated, and if with so little effort as is now made, such proceeds as those named are realized, what might we not do a few years hence, were we to set ourselves about the work of cultivation in earnest now? The principal varieties now grown among us are the native quince, the orange quince, the pear quince, the Connecticut, and the apple quince; all of which are good. Mr. Edward T. T. Smith, of Tisbury, has 120 trees of the orange quince.

THE PEACH.

The tree bearing this excellent fruit is in this climate apt to be rather short lived, and yet some varieties are grown with success. Comparatively few trees, however, until recently, have been set out by our citizens. The peach is said to be derived from Persia, where it still grows in its natural state—small, bitter, and without poisonous qualities. But this fruit, under the hand of cultivation, as is the case with other kinds, is no stinted affair. And in this country, especially in the softer atmosphere in latitudes just south of ours, it is in great abundance, and, when fully ripe, most delicious.

The native peach, the Clingstone, and the President, are among the varieties named to the Committee. Undoubtedly quite a number of young trees of different varieties have been lately set out. May the planters of them live to eat the fruit thereof, and that of the successors of those now planted, for very many years to come.

THE APPLE.

Whether the different kinds of fruit now known to us had their origin at the time referred to in the first chapter of the Bible, we have probably now no means of ascertaining, but it is not unlikely they are quite similar. "And the Lord God planted a vineyard eastward in Eden; and there he put the man whom he had formed. And out of the ground made the Lord God to grow every tree that is pleasant to the sight and good for food; the tree of life also in the midst of the garden, and the tree of knowledge of good and evil." It is an interesting fact that the Lord God made "ornamental" trees to grow—those "pleasant to the sight"—for the fact is an intimation to us, his children, that if He made them, it cannot be beneath our attention to cultivate them; and we show our appreciation of God's blessings to do so. But it is true also that the trees more important for the use of man were those "good for food."

Some in their pleasantry intimate that the fruit the eating of which by mother Eve was fatal, was the apple. But we shall never know in this life, at least, what it was, nor is it essential that we should know. But of this we are fully apprised, that our Heavenly Father has given to us this useful esculent to cultivate and to use wisely for food. And we may safely add that there is no species of fruit adapted to the climate in which we live, which is so permanently useful as the apple. It is said that the apple, in all the varieties in which we now cultivate it, is derived from the crab-tree, which is found wild in most parts of the world. If it would not be regarded as too much in the style of speculation, we would suggest that probably the fruit as now found wild has greatly degenerated from its original perfection, and that our efforts at cultivation are tending to restore it to its primal state. How wonderful that by the hand of cultivation, that less desirable article is brought into so many and so rich varieties!

As the result of very considerable labor it has been ascertained that there are on this island at least eighty different varieties of the apple, besides many trees whose names are not known to the owners. Among the former are many of the best known to New England growers. As with other fruits, there may be some shades of difference in opinion as to the relative quality and productiveness of even the best varieties, owing to local causes. But, so far as known, there is a very general agreement. A few of those which are regarded by our people as among the best, are the Baldwin, the Bunch apple, Hubbardston Nonesuch, Porter, Rhode Island Greening, Pippin, Roxbury Russet, the old-fashioned Russet, Pignose, Gilliflower, Summer Sweet, Winter Sweeting, and Tallman Sweeting. These have been named by some of our farmers; probably there are others in our long list equally as good.

THE PEAR.

In speaking of this as of all the other kinds of fruits herein named, the aim of your Committee is to be practical, and thereby to make their report useful to those to whose knowledge its contents may come.

The pear is one of the most luscious of esculents, and the extent to which it is preferred is indicated by the fact that it is cultivated so generally, not only by the larger farmers, and gentlemen of property who have retired with their competence from their wonted avocations to their country-seats, but also by numerous persons in their small garden lots, and by those of limited means. It is said that the pear grows wild in Europe, and that it is now cultivated in all temperate climes. It was known to the Greeks and Romans more than two thousand years ago. Probably no species of cultivated fruit upon the globe is grown in so many varieties. In the year 1851, Mr. Henry H. Crapo, of New Bedford, who is now governor of a Western State, published in pamphlet, with other matters, a list which probably contained about all in his large nursery, numbering about one hundred and sixty varieties. His successor in the nursery business, Mr. John McAffee, lately informed the chairman of your Committee that there were three hundred or more varieties. In examining a volume on "The Pear-Tree," by Thomas W. Field, printed in New York in the year 1859, we count up one hundred and sixty-eight native varieties and six hundred and eighty-two varieties of foreign origin, besides, interspersed among the last named, six hundred and fifty-three synonyms, or those similar to others but of different names. These all foot up one thousand five hundred and three varieties. Deducting the synonyms, we have left, native and foreign, eight hundred and fifty substantial varieties.

From the lists collected from about thirty of the fruit-growers on this island, we find nearly eighty different varieties cultivated here, besides, as in the case of the apple, the statement that there are more or less whose names are not known to the owner. There are, therefore, not many less than one hundred varieties of pears in the county. From our collected list we add together the testimony of a very considerable number of fruit-growers who have been questioned as to the best varieties for our soil and climate; for the man who designs to plant a few trees will certainly want those best adapted, and the one who plants extensively will want to do the same. We may omit some as good, but name the following:—

Doyenne d'Ete, ripe in July and August.
Jargonelle, English, ripe in July and August.
Dearborn's Seedling, ripe in August.
Bloodgood, ripe in August.
Tyson, ripe in August and September.
Bartlett, ripe in September.
Flemish Beauty, ripe in September.
Trescott and Buffum, ripe in September.
Seckel, ripe in September and October.
Louise Bonne de Jersey, ripe in September and October.
Belle Lucrative, ripe in September and October.
Beurre Clairgeau, ripe in October.
Duchesse d'Angouleme, ripe in October.
Vicar of Winkfield, ripe from November to January.
Lewis, a great bearer, ripe from November to February.
Catillac, will keep from December to April.

The State Agricultural Report well remarks, that "after a most diligent inquiry it will be found that few, very few, varieties, well chosen, will prove much more profitable for general culture than many sorts."

THE GRAPE.

This much coveted fruit, which is so universally known, also demands our consideration. Perhaps no fruit is more perfect in its wild state, as it grows in the swamps and forests, and yet it is greatly improved by cultivation. And this work of cultivation has greatly increased of late years. The last State Report says: "The cultivation of the grape has, during the last ten years, increased with a rapidity unparalleled in the case of any other fruit, and is destined to still further extension." For what was this island called Vineyard, if it was not that grapes once grew here in abundance? If there are not now so many wild as formerly, we must cultivate. If we cannot gather clusters as large as those found by the spies in "the valley of Eshcol," a bunch of which was enough for two men to lift, we can nevertheless appropriate rich varieties from our gardens and arbors. Although our climate is a little rigid, and we cannot, therefore, vie with those living in tropical regions, yet we have already proved that we can grow many rich varieties of the hardier kinds. It has been ascertained that there are now cultivated in our county at least twenty-nine known varieties. There are probably some others whose names have not been obtained, and yet others whose names may not be known to growers. Among those on our collected list, and those most generally approved as adapted to our soil and climate, are the Concord, the Delaware, the Iona, Hartford Prolific, Dracut Amber, Diana, Rogers Hybrid, Nos. 15 and 19, Northern Muscadine, Union Village, Catawba, Sage, Logan, and, last but not least, the Isabella, which should not be despised for its old age. The last State Report says: "Varieties with a thick skin are preferable for keeping, and among these none have succeeded better than the Diana."

GENERAL REMARKS.

Having passed briefly over the series of fruits assigned to to them, your Committee wish to add a few general remarks.

PRUNING.

Most people prune in the spring. Some writers recommend other seasons of the year. Undoubtedly the spring is the best time for the severing of very considerable branches, and even then the wounds should be well covered. But for the heading in of young trees, some think the best time is when the growing ceases for the season, and immediately after the fruit is gathered. Then, it is held, the ends left bare have a good while in which to harden, and the trees and vines will be all ready in spring-time to put forth vigorously without the loss of time. Others think that pruning trees at the season named, the ends of the twigs left bare by cutting are apt to winter-kill, and that fruit is lost thereby. All agree that autumn is the time for pruning grape-vines. As to trees, as in other things, experience is the best schoolmaster.

WORK WILL PAY.

Allow us to suggest: Set out young trees, protect their roots from the hard frosts, and dress with old dressing. Thus multiply your number of trees. Graft and bud extensively! Mr. Christopher R. Beetle, of Edgartown, has, by grafting, thirty different varieties of pears on one tree. Raise your own grape-vines from cuttings of the best varieties, and thus save purchasing.

WE SHOULD WORK BOTH FOR OURSELVES AND FOR OTHERS.

Some say they have not the time. It is rather, probably, in many cases, the lack of an inclination. How much more time is squandered in various ways than would suffice to make every land-owner a good orchard and garden. Persons somewhat advanced in life neglect to plant trees and vines because they think they may not live to eat the fruit. Is not this selfish? And do we not almost all of us work for posterity by endeavoring to add to our possessions in some way? Continue, fellow-citizens, to improve your premises in the matter of fruit-growing, as well as in other things. Somebody will reap the benefit.

HEBRON VINCENT, *for the Committee.*

GRAPE VINERIES.

NORFOLK.

From the Report of the Committee.

The cultivation of the foreign grape was once thought to be the nice point in horticultural practice; but the success which has attended its cultivation where it has received the practical judgment and care which is necessary in the culture of any plant requiring, as this does with us, an artificial climate, has dispelled the mystery which was thought to attend its culture. Experience has proved that no crop is more sure, and that there is no luxury more within the means of the classes in moderate circumstances than this; and the time will come when the cheap cold vinery will be considered indispensable to every good family garden. In the line of the small fruits the grape fills a larger space in the season than either the strawberry, raspberry, currant or blackberry, lasting, with proper management, from the first of September until winter, and it is the universal favorite of the whole season.

The vineries of Charles B. Shaw, Thomas Barrows and Ira Cleveland, Esqs., all of Dedham, were entered for our inspection. These houses have been under the general supervision of Mr. Robert Watt, of West Roxbury, from their first start, and they attest his superior skill in their management. The house of Mr. Shaw was built in 1851, and is consequently sixteen years old. The remarkable success attending this house, it never having failed to produce a full crop of well-ripened fruit, induces us to present to the society Mr. Watt's own account of its management.

"The house is sixty feet long and twenty feet wide; the borders all on the outside, twenty feet wide and three feet deep in its whole length, and composted of top-spit of pasture manure one-quarter, and three tons of bone thoroughly mixed. There are nineteen vines of the following varieties: Hamburgs, (the Black, Victoria and No. 16,) Chasselas of Fontainbleau and Zinfandale. Two years old when planted, small but finely rooted, the first season they made a growth of about twenty feet. In the fall they were cut back to three eyes; the second year they made fine canes, reaching the top of the rafter. At the fall pruning they were cut back to about six feet. The third year they bore from eight to ten bunches each of good, well-ripened fruit. Succeeding years, at the fall pruning, they were allowed three or four feet of the new wood until they reached the top of the rafters. Since coming into full bearing, they have yielded more than six hundred pounds yearly of well-ripened fruit."

They are grown on the "spur system," which Mr. Watt considers the best. They give entire satisfaction and show no signs of deterioration.

This house is built in accordance with the old English system, with heavy sliding sashes, and in the most thorough and costly manner, the vinery itself costing about $1,000. The yearly expense for labor is about $25. The continued success of this vinery, no doubt, is owing to the faithfulness of Daniel Murry, who has had charge of its ventilation from the beginning, and for which he is entitled to much credit.

The grape house of Mr. Barrows has been built six years. It is forty feet long by sixteen wide; the border nineteen feet wide and three feet deep, of the same materials as the former. It is built without sashes, the glass being set into the rafters. Air is given at the top, the same as raising a skylight, which is considered much better than the sliding sash. It cost, with shed attached, about $600. It has thirteen vines, viz.: Hamburgs, (Black, Victoria, No. 16,) and Wilmot's Black Hamburg and White Frontignac. *The Wilmots* are not considered worthy of cultivation when there are so many superior kinds to be had. The yearly cost of keeping this house is about $20. It has proved an entire success.

Mr. Cleveland's house was started in the spring of 1863. It is on the same plan as that of Mr. Barrows, and cost about $500. Its border, however, is on the inside, to give chance for extra vines on the back wall. It has twenty-two vines, eleven on the rafters and eleven on the back wall. The varieties are Black, Victoria and Golden Hamburgs, Royal Muscadine, White Frontignac and White Toke. The crop this year is most extraordinary.

Mr. Watt would not recommend an inside border for a cold grapery under any consideration. It is a great extra cost to keep it watered, and requires much additional care with no corresponding advantage in its results.

Your Committee regret that they have no house to present constructed on a cheaper scale, as they are of the opinion that houses may be built at a cost of about ten dollars per foot that would answer the purpose, and thus bring this great luxury within the means of the million; as they believe there is no plant that will give as good returns as the vine under good management, and none that will stand so much maltreatment and yet give good returns.

For the Committee,

ELIPHALET STONE.

CRANBERRIES.

PLYMOUTH.

From the Report of the Committee.

There were four entries for the premiums, "for the most successful experiment in preparing meadow and covering not less than one-quarter of an acre with cranberry vines," viz.: Messrs. Gifford & Loring (Stephen N. Gifford and John S. Loring,) of Duxbury, Andrew J. Hadley, of Marion, Ephraim Stetson, of Halifax, and Austin J. Roberts, of Lakeville.

The meadow of Messrs. Gifford & Loring has been annually visited by the Supervisor, at or about the time of harvest, and has uniformly presented a most satisfactory appearance. Their experiment has proved, beyond all question, the most successful of any entered for premium. If there have been experiments in the county more successful than this, those who have made them have been most truly fortunate; but none such have come to the notice of the Supervisor. When last visited, Sept. 10, 1867, their meadow presented an exhibition worth travelling miles to witness, by any one having a taste for the beautiful or an eye to the possibilities of profit in cranberry culture. The whole surface was covered with a carpet of bright green, thrifty vines, scarcely a weed or a blade of grass being visible amongst them, while the vines themselves were laden from top to bottom with the finest of berries, already changing from white to spotted and from spotted to red or scarlet, giving indications of early ripening and of entire exemption from worms or rot, whose ravages so often blast the hopes of cultivators of this most wholesome and popular fruit. Messrs. Gifford & Loring were not without experience in this business, having prepared and cultivated successfully a portion of the same swamp before commencing this experiment. They have also this fall set vines upon another portion, prepared during the past summer. They say in their statement:

"The piece of cranberry meadow which we present for premium, contains about seven-eighths of an acre. The meadow was originally what is called a whortleberry swamp, being covered with these bushes, together with a few pines and maples.

"Our first operation was to remove the bushes, cutting them, saving such as were large enough for fuel, and burning the remainder upon the ground. The turf with the roots was then removed down to the peat, which fills the entire basin comprising the meadow, and is from six to ten feet deep. The turf we used in making a fence around the meadow, which serves the purpose admirably well, making a durable structure, and also a defence against cold winds.

"We then ran parallel ditches, two feet wide, and some thirty feet apart, from the upland to the central drain, which had been dug in the preparation of another piece for the same purpose. The meadow was then made as level as possible, and covered with about two inches of sand taken from the upland adjoining the meadow.

"There is much care to be used in the selection of the sand, getting that that is called 'dead,' containing no clayey particles, and the coarser the better.

"The swamp was cleared in 1861, and the vines set in 1862. This piece was set in drills about eighteen inches apart. We think it not material whether this plan is pursued, or that the vines be set in hills from eighteen inches to two feet apart.

"We got no fruit from the meadow of any consequence, until 1865, when we picked about forty-five barrels, which we sold for about $9 per barrel, net. In 1866, we took about twenty-five barrels, which yielded about $8 per barrel. This year we gathered nearly fifty barrels, which we have not yet sold, but from present appearances, we shall probably realize something like $8 per barrel.

"The cost of clearing the swamp and setting the vines, as near as we can come at it, has been nearly $500. The result after three years' crops, is something like the following:—

The cost of the land, &c.,		$500 00
The crop of 1865,	$405 00	
of 1866,	200 00	
of 1867,	400 00	
		1,005 00
Leaving a balance of,		$505 00

"We would add that the vines are now in fine condition, and promise to do as well for the future as they have done for the past three years."

The first premium, $15, is awarded to Messrs. Gifford & Loring.

Mr. Hadley had also been a successful cultivator of cranberries before commencing upon that portion of his meadow which he entered for premium. His experiments have been made partly upon salt marsh, protected from the intrusion of the sea by a dike. His location gives him advantages not possessed by many other cultivators. A considerable portion of the surface is cleared and levelled to his hand, in advance, saving him the large preparatory outlay necessary in most situations in this county where experiments have been made. After exposure to the rains for a few years the marsh becomes so far divested of its saline properties that vines set in the pure peat will grow rapidly, overpower the native grasses, and produce fruit comparing favorably with that grown upon the most carefully prepared meadows. In fact, some of the finest berries noticed upon his grounds were upon vines thus set and left to fight their own way into possession. If he chooses to sand his meadows before setting the vines he has an inexhaustible supply of excellent gray sand below the peat, which he can obtain by sinking small pits wherever necessary, to be afterwards filled with other material, care being taken to give the surface as nearly as possible its original characteristics. He has also facilities for flowing his meadows, although he has not often resorted to them except for winter flowage.

The last and greatest of all his advantages is in the immunity of his meadows from frosts. Situated as they are, immediately upon the shore of Buzzard's Bay, he finds it safe to leave the fruit upon the vines till fully ripe, whereby its flavor and its keeping qualities are both greatly improved. What are called "white frosts" injure only unripe berries. Where the fruit can safely remain upon the vines till October, as it can here, it acquires sufficient hardiness to bear exposure to such frosts with a good degree of impunity.

Mr. Hadley's experiments, if not fully answering his expectations, have been decidedly successful, and few cultivators have more reasons for encouragement than he, or greater inducements to perseverance. He says in his statement:—

"I have about two acres of land inclosed. When I bought it, about one-half was swamp, covered with alders, laurels, dogwood, water-bush, briers, &c.; the other half was where the salt water flowed at full tides; where the square and two-ended grass grew. I have expended on the above as follows:—

Land,	$15 00
Diking,	95 00
Cutting and burning bushes, turfing, ditching and grading,	106 60
Vines and setting,	50 00
Hoeing,	9 00
	$275 60

"About three-fourths of an acre of the above swamp land I have entered for premium on cranberry meadow. Cost and expenditures as follows:—

Land, at the average,	$4 62
Diking, at the average,	35 00
Cutting and burning bushes, ditching and sanding,	68 00
Vines and setting,	48 00
Hoeing,	9 00
	$164 62

"On one-half an acre the vines were set in the spring of 1862, and on the other quarter of an acre in the spring of 1863. In 1865 I picked 95 bushels of berries; in 1866, 11 bushels; in 1867, 108 bushels.

"In the fall of 1865 my vines looked very finely, but during the winter of 1865–6 they were very much damaged, by what or how I cannot say; and, in the summer following, the fruit, upon most of what were alive and blossomed, was destroyed by the berry-worm."

To Mr. Hadley is awarded the second premium, $10.

Mr. Stetson entered for premium about sixty-five square rods, upon which vines were set in 1864, '65 and '66, and from which he harvested, the present season, nine bushels of cranberries. This plot, together with an adjoining piece, containing about one hundred and sixty-three rods, he has changed from an old and very rough cedar swamp bottom to its present condition, at a cost of nearly ten years' continuous labor. In effecting this he has not only cleared the surface of very large quantities of bushes, stumps and trees, but with his wheelbarrow and shovel has covered the whole with gravel, from one to two feet in thickness, removing for this purpose almost a mountain of earth.

His selection of a location seems to have been an unfortunate one. Portions of his swamp, at the commencement, appeared as if afloat, undulating perceptibly beneath the tread, and the whole was but slightly above a permanent water-level. To obtain an even and in his judgment a sufficiently elevated surface, he began by applying gravel in such quantities as to place the original peat bed far below the reach of the vine roots. In this condition it was evidently as unfit for the growth of cranberries, aside from additional moisture, as the base of the hill from which the gravel was taken. With an indomitable and characteristic perseverance, he has endeavored to overcome this difficulty by covering the gravel bed thus formed with a layer of peat and swamp moss, and this again with another layer of gravel in which his vines have been set. But this layer of peat and moss, although some six inches in thickness when first applied, must, under the pressure of an equal thickness of gravel above, and through the decomposition of the moss, be soon reduced to a very thin stratum. If, in this condition, his vines ever yield abundantly, it will be made certain that cranberries will thrive upon a great deal of gravel very slightly sandwiched with peat. As yet, however, he has received but a meagre return in fruit for all his years of toil. His vines look well, and annually, in the early part of the season, give promise of yielding well, a promise thus far unfulfilled at harvest time, the worms, frost and rot, the latter especially, making sad havoc with his crops.

For the prevalence of the rot here, neither cause nor remedy is known. Experts are fertile in suggestions; but they can only suggest, not demonstrate. One thinks it may be owing to excess of moisture; but many natural meadows, not as dry as this, produce abundantly and mature their fruit perfectly. Another would find the cause in the want of a free circulation of air. But known facts, as to both natural and cultivated meadows more completely sheltered than this, are at variance with this theory. Still another suggests some peculiar property in the gravel applied. There may be something in this suggestion, as the gravel used by Mr. Stetson is much coarser than that used in most other instances, and of a different color. It is earnestly to be hoped that those who are preparing cranberry meadows will cause a careful analysis to be made of the sand or gravel with which they are covered, in order that the effect of different mineral substances upon the growth and productiveness of the vines may be ascertained.

It is recommended that a gratuity of five dollars be paid to Mr. Stetson.

Mr. Roberts having sold his meadow and no statement having been furnished, the entry is considered as withdrawn.

In a report on this subject, made by your Supervisor four years ago, the cultivation of cranberries was stated to be a very uncertain business. No good reasons are yet apparent for a different conclusion. Success is more than possible, and when secured the profits are almost fabulous. But the conditions necessary to success are so imperfectly understood that, at the outset of an experiment, it is virtually a mere matter of chance whether it will prove a success or a failure. In proof of this it may, and perhaps should be stated, that neither of the two experiments for which premiums were awarded in 1863, as being the most carefully conducted and as promising the best results, has proved remunerative to any considerable extent; and the four years which have since elapsed certainly include that stage of growth when cranberry vines are in the most favorable condition for productiveness. Both these meadows were prepared at considerable cost, and in both, owing to the location, the quantity of gravel was made greatly to exceed the quantity of peat accessible to the vines. Mr. Gifford's meadow, on the contrary, which has more than twice paid for itself in three years, received only a thin layer of sand upon a level bed of clean peat. Mr. Hadley's meadow was prepared in a similar manner. These facts seem to indicate that the presence of peat in considerable quantities, if not essential to the growth of vines, is at least conducive to the perfecting of their fruit.

Notwithstanding the uncertain nature of the business, the cultivation of cranberries is well worthy the attention of any one having a suitable location, and sufficient means for prosecuting it without interfering with other and more certain avocations. A few days spent in the examination of meadows already prepared, and in acquiring a knowledge of the methods pursued and the material used in their preparation, would enable beginners to profit by the experience of others and to avoid many mistakes to which they would otherwise be liable.

Alden S. Bradford, *Supervisor.*

FOREST TREES AND SHRUBS OF HINGHAM.

HINGHAM.

The society appointed a committee to prepare lists of the trees and shrubs of Hingham, with a view to create a taste for the study of this branch of our natural history. The committee consisted of James S. Lewis and Fearing Burr. They have labored with great diligence to perfect a catalogue, which was reported to the society, accepted and ordered to be printed with the "Transactions" of 1867. The report which follows was drawn up by Mr. Lewis, and is believed to be as correct as a laborious investigation for a series of years and an extensive knowledge of the subject could make it:—

1. Cornaceæ, Dogwood Family. *Cornus Florida*, Flowering Dogwood; *Nyssa multiflora*, Tupelo, Sour Gum Tree, Hornbeam.

The Cornus is not a large or very common tree, but is easily recognized by its display of large white flowers in the latter part of May or in early June. Its wood is of a close texture, and is susceptible of a fine polish.

The Nyssa, best known in this place as hornbeam, deserves attention as an ornamental tree.

2. Aquifoliaceæ, Holly Family. *Ilex opaca*, American Holly.

The Holly is not abundant; its wood is compact, close-grained and of a satin texture, much used in the mechanic arts.

3. Urticaceæ, Nettle Family. *Ulmus Americana*, American White Elm; *Celtis Occidentalis*, Nettle Tree, Hoop Ash.

Few trees will bear transplanting so well as the elm, and no other perhaps assumes so many striking and beautiful varieties of form. Its blossoms appear before the leaves, and as soon as the leaves are fully grown its fruit is matured.

The Celtis is found growing sparsely in the north-western section of this town. Its cultivation in France is said to yield a large return.

4. Lauraceæ, Laurel Family. *Sassafras Officinale*, Laurus Sassafras.

5. Rosaceæ, Rose Family. *Prunus Pennsylvanica*, Wild Red Cherry; *Prunus serotica*, Wild Black Cherry; *Amelanchier Botryapium*, Shad Bush, June Berry.

The wild red cherry is a small tree, rarely thirty feet in height, of frequent occurrence in our forests.

The wild black cherry flowers in racemes, like the currant. Its ripe fruit is very palatable.

6. Leguеminosæ, Pulse Family. *Robinia pseudacaciæ*, Common Locust, or False Acacia.

This appears to be the only tree of this family that is naturalized in Hingham. It is distinguished for the beauty of its leaves and the fragrance of its flowers; but is subject to the attacks of insects which threaten its extermination.

7. Cupuliferæ, Oak Family. *Quercus alba*, White Oak; *Q. bicolor*, Swamp White Oak; *Q. castanea*, Chestnut Oak; *Q. montana*, Rock Chestnut Oak; *Q. chinquapin*, Little Chinquapin Oak; *Q. tinctoria*, Black or Yellow-barked Oak; *Q. coccinea*, Scarlet Oak; *Q. Rubra*, Red Oak; *Q. ilicifolia*, Bear Oak;

Q. obtusiloba, Post Oak ; *Fagus ferruginea*, American Beech ; *Carpinus Americana*, American Hornbeam ; *Ostrya Virginica*, American hop hornbeam ; *Castanea vesca*, Chestnut.

The above-named oaks constitute ten of the eleven species of oaks described by Emerson in his work on the trees and shrubs of Massachusetts. The chestnut oaks are rarely to be found, and only one specimen of the post oak has been positively identified. Mr. Emerson says (and it strictly accords with our own observation,) that the oaks are divided into two well-defined sections according to the character of their leaves ; the first comprising those species whose leaves are destitute of flexible points or bristles ; the second, those the segments of whose leaves are mucronate, or terminate in bristles. A very important difference is also observed in the length of time required for the blossoms to bring their fruit to maturity. The oaks which belong to the first section blossom in the spring and bring their fruit to maturity in the fall. In those included in the second section, on the contrary, the fertile blossom makes its appearance in the axils of the leaves on the new shoot, and remains a whole year without change. In the spring of the second year after a new shoot has been produced, and new barren and fertile flowers have made their appearance, it is probably for the first time fertilized, and then begins to increase, and brings its fruit to maturity eighteen months after its first appearance. The wood of the white oak is much used in the structure of articles in which strength, firmness and durability are essential properties. The swamp white oak is fine grained and possesses great strength and elasticity. The little chinquapin seldom exceeds ten feet in height, produces small acorns in abundance. It is found at Cobb's Bank and at other places near the seashore.

The yellow-bark oak is distinguished from all others, by the rich yellow color of its inner bark ; for fuel it is nearly equal to walnut. The scarlet oak for fuel is decidedly inferior to the above-named. The red oak is of the least value for fuel, but no oak in this climate surpasses it in beauty of foliage ; and none attains to more magnificent proportions. The bear oak seldom reaches the height of eighteen feet. It grows in various soils and situations. The American beech does not abound. Its wood is very close grained and is much used in the mechanic arts. The American hornbeam, sometimes called blue beech, is a small and somewhat rare tree. Its trunk is bluish and is marked with longitudinal, irregular ridges, resembling those on the horns of animals of the deer kind. The hop hornbeam, or iron wood, is readily recognized, when in fruit, by the resemblance of its spikes of seed-vessels to those of the hop. The chestnut is here of rare occurrence as a forest tree. We have no knowledge that any cultivated tree in town, of which there are several, has ever matured its fruit.

8. JUGLANDACEÆ, Walnut Family. *Carya alba*, Shellbark or shagbark hickory; *C. tomentosa*, Mocker-nut or white heart hickory; *C. glabra*, Pig-nut, or broom hickory; *C. amara*, bitter-nut or swamp hickory.

The shagbark bears a fruit, the best varieties of which are equal to any imported nut, and it has been thought that by careful selection and cultivation it may be made superior to any nut now known. The mocker-nut tree is not very plentifully distributed. It may be distinguished from the shagbark by the less shaggy nature of its bark, and by the number of its leaflets, it having seven or nine while the shagbark has but five. The pig-nut hickory is most abundant. The bitter-nut hickory is very rare.

9. BETULACEÆ, Birch Family. *Betula alba*, American white birch; *B. excelsa*, Yellow Birch; *B. lenta*, Cherry-Birch, sweet or black birch; *B. papyraceæ*, Paper birch, canoe birch.

The white or gray birch is very common; makes good fuel when properly prepared and housed in season. The yellow birch occurs less frequently. The black birch is distinguished for the spicy odor and taste of its bark. The canoe birch, may be found near Hewitt's Cove. It appears to be limited to that locality.

10. PLATANACEÆ, Plane-tree Family. *Platanus occidentalis*, Buttonwood or Sycamore.

A favorite ornamental tree of former times, fast becoming extinct, owing to the want of vitality in its buds.

11. CONIFERÆ, Pine Family. *Pinus strobus*, White Pine; *P. rigida*, Pitch Pine; *Abies Canadensis*, Hemlock Spruce; *Cupressus thyoides*, White Cedar; *Juniperus Virginiana*, Red Cedar, Savin.

The white pine may be found in all, or nearly all parts of our forests. It is in great demand for manufacturing purposes. None of our forest trees would sooner or more generously repay the cost of cultivation. Pitch pine is scarce. It is said to be an excellent material for floors, as durable as the Southern, and more beautiful. Hemlock, as a fuel for close stoves, is not much inferior to maple. White cedar timber has become scarce, probably owing to the increased use of it in the manufacture of wooden ware.

12. SALICACEÆ, Willow Family. *Salix alba*, White or Yellow Willow; *Populus tremuliformis*, American Aspen; *P. grandidentata*, Large Toothed Aspen; *P. candicans*, Balm of Gilead.

13. SAPINDACEÆ, Soap Berry Family. *Acer saccharinum*, Sugar Maple, or Rock Maple; *A. rubrum*, Red or Swamp Maple.

The sugar maple is not common in our forests. It appears to be growing in favor as an ornamental tree. The red maple thrives in a variety of soils.

14. OLEACEÆ, Olive Family. *Fraxinus Americana*, White Ash; *F. sambucifolia*, Black or Water Ash; *F. pubescens*, Red Ash.

The white ash occurs most frequently and in the greatest variety of soils. It will bear transplanting as well as any tree with which we are acquainted. The black ash is not so widely diffused as the white. Its wood is not so good for fuel. It is of use in the manufacture of baskets. The red ash has a very limited range.

15. TILIACEÆ, Linden Family. *Tilia Americana*, Bass Wood.

SHRUBS.

1. OLEACEÆ, Olive Family. *Ligustrum vulgare;* found near Martin's Well and in other places in the north part of the town. Flowers in May, June. Naturalized from Europe.

2. RUBIACEÆ, Madder Family. *Cephalanthus occidentalis*, Button Bush; flourishes in marshy places; July, August.

3. CORNACEÆ, Dogwood Family. *Cornus alternifolia*, *C. paniculata*, *C. circinata*, *C. sericea*, *C. stolonifera;* river-banks, swamps, &c.; May, June.

4. HAMAMELACEÆ, Witch Hazel Family. *Hamamelis Virginica*, Witch Hazel; October, November.

5. AQUIFOLIACEÆ, Holly Family. *Ilex verticella*, Black Alder, Winter-berry; May, June. *I. glabra*, Ink-berry; an evergreen

used in bouquets. June. *I. lævigata*, Smooth Winter-berry; flowers in June. *Nemopanthes Canadensis*, Mountain Holly; May.

6. Caprifoliaceæ, Honeysuckle Family. *Sambucus Canadensis*, Common Elder; *S. pubescens*, Red-berried Elder, rare; May. *Diervilla trifida*, Bush Honeysuckle, rare; June, Aug. *Viburnum lentago*, Sheep-berry; May, June. *V. dentatum*, Arrow-wood; *V. acerifolium*, Maple-leaved Arrow-wood; May, June. *V. nudum*, Withe-rod; May, June. *V. lantanoides*, Hobble-bush, American Wayfaring-Tree, South Scituate, near the south bounds of Hingham, in cold, moist woods; May.

7. Grosulaceæ, Currant Family. *Ribes hirtellum*, smooth wild Gooseberry; May. *R. floridum*, Wild Black Currant; May. *R. lacustre*, Swamp Gooseberry; June.

8. Rhamnaceæ, Buckthorn Family. *Ceanothus Americana*, New Jersey Tea, Red Root; found growing near Water Street. A pretty shrub, flowers white; July.

9. Celastraceæ, Staff Tree Family. *Celastrus scandens*, Wax-work, Climbing Bitter-sweet.

10. Vitaceæ, Vine Family. *Vitis labrusca*, Northern Fox-grape; *V. æstivalis*, Summer Grape; *V.cordifolia*, Frost-Grape; *Ampelopsis quinquefolia*, Virginian creeper, American Ivy; July.

11. Anacardiaceæ, Cashew Family. *Rhus typhina*, Staghorn Sumach; *R. glabra*, Smooth Sumach; *R. venenata*, Poison Sumach or Dogwood; *R. copallina*, Dwarf Sumach; *R. toxicodendron*, Poison Ivy, Poison Oak.

12. Berberidaceæ, Barberry Family. *Beberis vulgaris*, Common Barberry; Nat. from Europe.

13. Ericaceæ, Heath Family. *Gaylussacia dumosa*, Dwarf Huckleberry; *G. frondosa*, Dangleberry; *G. resinosa*, Black Huckleberry; *Vaccinium virgatum*, Blue Huckleberry; *V. corymbosum*, Common Swamp Blueberry; *V. macrocarpon*, Cranberry; *V. vacillans*, Low Blueberry; *V. Pennsylvanicum*, Dwarf Blueberry, South Scituate; *Epigæa repens*, May Flower, woods near Whiting and Ward Streets; April. *Clethra alnifolia*, common; flowers terminal, fragrant, white; July, August. *Gaultheria procumbens*, Box-berry; July. *Cassandra calyculata*, Leatherleaf, evergreen, roadside, Cushing Street; flowers in April. *Kalmia latifolia*, Mountain Laurel; *Rhodora canadensis*, May; *Kalmia angustifolia*, Sheep Laurel; *Azalea viscosa*,

Swamp Honeysuckle; July, August. *Arctostaphilos uva-ursi*, Bear Berry; May; rare. *Andromeda ligustrina;* June, July. *Leucothoë racemosa;* May, June.

14. ROSACEÆ, Rose Family. *Prunus Virginiana*, Choke Cherry; *P. maritima*, Beach Plum; *Cratægus coccinea*, Scarlet-Fruited Thorn; *C. tomentosa*, Pear Thorn; *C. crus-galli*, Cock-Spur Thorn; *Pyrus arbutifolia*, Choke Berry; *Spirea salicifolia*, Common Meadow Sweet, Eu.; *S. tomentosa*, Hardhack; July. *Rosa rubinginosa*, Sweet Brier; June, August; Nat. from Eu. *R. Carolina*, Swamp Rose; June–Sept. *R. lucida*, Dwarf Wild Rose; *Rubus occidentalis*, Thimbleberry; black cap, *R. strigosus*, Wild Red Raspberry; *R. villosus*, High Blackberry; *R. Canadensis*, Low Blackberry; *R. hispidus*, Running Swamp Blackberry.

15. LAURACEÆ, Laurel Family. *Benzoin odoriferum*, Ginger Bush, Spice Bush; March.

16. RANUNCULACEÆ, Crowfoot Family. *Clematis Virginiana*, Common Virgin's Bower; July, August.

17. MYRICACEÆ, Sweet Gale Family. *Comptonia asplenifolia*, Sweet Fern, common; April, May. *Myrica cerifera*, Bayberry, Wax Myrtle, common; May.

18. BETULACEÆ, Birch Family. *Alnus incana*, Speckled or Hoary Alder; *A. serrulata*, Smooth Alder.

19. CUPULIFERÆ, Oak Family. *Corylus Americana*, Wild Hazel-Nut; *C. rostrata*, Beaked Hazel-Nut.

20. SALICACEÆ, Willow Family. *Salix tristis*, Dwarf Gray Willow; *S. humulis*, Low Bush Willow; *S. discolor*, Glaucus Willow; *S. serica*, Silky-Leaved Willow; *S. petiolaris*, Petioled Willow; *S. purpurea*, Purple Willow, adv. from Eu.; *S. longifolia*, Long-Leaved Willow; *S. pedicellaris*, Stalk-Fruited Willow.

21. SMILACEÆ, Smilax Family. *Smilax rotundifolia*, Greenbrier, Horsebrier; *S. herbaceæ*, Carrion Flower, flowers fetid; June.

22. CONIFERÆ, Pine Family. *Juniperus communis*, Common Juniper. This shrub, which is troublesome in some places farther north, is fortunately of rare occurrence in this town; Eu., May. *Taxus baccata*, American Yew, Ground Hemlock, found in South Scituate, not far from the Hingham line, and probably exists in Hingham; Eu., April.

GENERAL CROPS.

HIGHLAND.

From the Report of the Committee.

In some cases your Committee have been asked if the premium was to be awarded "by the eye," or according to the written statement. Our reply uniformly has been, that we should adhere to the regulations of the Board. Various responses have been made to this reply, some approving and some condemning, partly because the labor required was more than the value of the premium, and partly because they did not know how to fill out the statements. After the experience your Committee have had, they are more firmly convinced that the regulations of the State Board are neither onerous nor unreasonable, and that the faithful compliance with them will conduce to a more accurate, thoughtful and scientific manner of farming, and will lead the farmer to a more careful study of cause and effect. In this connection, the Committee regret that all those who made entries of crops have not seen fit to make statements of the same, even though the amount of crops would not seem to justify a premium. More useful scientific knowledge is often gained from a failure than from a success, and it is only by carefully studying the causes of failure as well as success that absolute knowledge is obtained. We also are satisfied, from an examination of the statements, particularly in reference to root crops, that the farmers in the limits of the society can raise as productive crops as any other in the State, and we can but commend this branch of agriculture to the more careful attention of our farmers. Even though grazing forms the principal business in this society, we believe large root crops will be found a powerful auxiliary, neglecting to cultivate which will be found poor economy.

M. J. SMITH, *for the Committee.*

TABLE OF SWORN STATEMENTS.

Crop.	COMPETITORS.	Crop of 1865.	Manure, 1865. No. Loads.	Crop of 1866.	Manure, 1866. No. Loads.	Soil.	When and how deep ploughed.	Cost of Ploughing.	Manure, $1 per Load. No. Loads.	When planted and cost.	Seed, & Cost of.	Cost of Cultivation.	Harvested.	Cost of Harvest.	Am't of Land. Acres.	Am't of Crop.	Amount per Acre.
Orchard,	Calvin Smith, .	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Corn, .	Putnam Ames,	Buckwheat,	12	Corn, .	20	– Loam,	May 24, 5 inches,	$4 00	27, br'd-cast, .	May 25, $5 00	–	$6 00	Sept. 21,	–	1	lbs. 3,625	Bush. 60 5-12
Oats, . .	Orrin Millard, .	Corn and Potatoes,	30	Corn and Potatoes,	25	Yellow "	May 11, 8 inches,	4 00	–	1 50	Oats, $3 50	–	Aug. 26,	$9 00	1	1,642	51⅜
–	Harvey Root, . .	Potatoes, .	15	Corn, .	20	Yellow "	Spr. & F'l, 8 inches,	5 00	–	May 10, $1 00	5 00	–	Aug. 20,	15 00	1	2,560	80
Barley, .	Harvey Root, .	Grass, . .	*	Corn, .	15	Light "	Spr. & F'l, 8 inches,	5 00	*	May 13,	4-rowed, 6 00	–	Aug. 15,	4 00	1	1,680	35
Potatoes,	Orrin Millard, .	Potatoes, .	15	Oats, . .	*	Dark "	May 21, 8 inches,	4 00	30	May 24, $5 00	Chili's & St. H., $11 00	8 00	Oct. 12,	10 00	1	13,360	222⅔
–	D. Dickson, .	Grass, . .	*	Grass, .	*	Yellow "	May 15, 5 inches,	7 25	20	May 18, $6 00	Chili's, 13 00	5 62	–	10 00	1	9,424	157⅔
–	Lester Root, .	Grass, . .	*	Grass, .	6	Dark "	May 20, 7 inches,	2 50	6	June 1, $3 00	Chili's 15 bush. $8 00	6 00	Oct. 1,	8 00	¾	9,900	220
–	J. Robbins, .	Oats, . .	10	Potatoes,	20	Black "	June 5, 6 inches,	2 00	14	–	Chili's, 12 00	3 00	Oct. 15,	6 00	1	3,685	61½
Carrots, .	Putnam Ames,	Corn, . .	3	Carrots, .	9	Yellow "	May 23, 6 inches,	2 50	7	May 28,	1 50	10 00	Oct., –	10 00	¼	8,160	593 5-11
Spring Turnips,	Putnam Ames,	Corn, . .	3	Turnips,	9	Yellow "	May 23, .	2 00	7	May 31,	–	5 00	Oct. 25,	7 00	¼	12,220	814¾
–	Samuel Smith,	Oats, . .	6	Turnips,	6	Yellow "	June 20, 8 inches,	2 50	8	June 20,	50	6 00	Nov. 10,	3 00	¼	8,050	536⅔
Grass, .	Wm. B. Pitt, .	Grass, . .	*	Grass, -	*	– "	–	–	12	–	–	–	–	–	3	feet. 4.747	tons. 3 4-25
Beets, .	Orrin Millard, .	Grass, . .	*	Turnips,	8	Yellow "	May 31, 9 inches,	3 00	9	May 31,	3 00	5 00	Oct. 22,	5 00	¼	lbs. 12,040	802⅔
Sowed Corn,	Orrin Millard, .	Grass, . .	*	Grass, .	*	Yellow "	Sept. and May, 8 inches,	5 00	10 per ¼ acre,	June 7,	½ bu. W. Corn, $4 00	3 00	Sept. 17,	5 00	¼	49,600	per ¼ 12,400
–	M. F. Watkins,	Grass, . .	*	Grass, .	*	Gravel, . .	Once, 7 inches,	6 00	20 per acre.	–	6 00	4 00	–	7 00	¼	51,040	per ¼ 12,760

* None.

GRAIN CROPS.

ESSEX.

Statement of Oliver P. Killam.

The land upon which was grown the crop of corn which I offer for premium, possesses a dark, gravelly, loamy soil ; and in the years 1865 and 1866, English hay was raised upon the same without the use of any manure. For a corn crop, the ground was ploughed once eight inches deep, just before planting, and seventy-six loads of manure turned under. The ground upon which the corn grew measures three and three-fourths acres. The land was harrowed and furrowed, and manured in the hill with twenty loads of compost. The cost of ploughing was $22.50 ; of harrowing and furrowing, $10 ; and the value of the manure—twenty-four cords—on the ground, was $192. The field was planted from the 20th to the 30th of May, three and one-half feet apart each way, with thirty-seven and one-half quarts of yellow eight-rowed corn. The cost of seed and planting was $25. The field was cultivated three times each way, and hoed twice before haying, and the weeds were also knocked out with hoes on the 10th of August. The cost of cultivation, including weeding, thinning, and clearing out weeds, was $30. The top stalks were cut off from the 16th to the 21st of September, and the corn was got in and husked from the 20th of October to the 7th of November. The cost of cutting and securing the stalks, was $15 ; of harvesting and husking, $35. Amount of corn produced on three and three-fourths acres, six hundred bushels in the ear. Estimated amount of top stalks, forty tons ; valued at $60. Estimated amount of butt stalks, eight tons ; valued at $64.

Statement of Eugene W. Day.

The land upon which this crop of oats was raised, was formerly covered with a heavy growth of oak timber, and it was next used thirty years as a pasture. Within a few years it has been converted into a field. In 1865, it was planted with corn and potatoes, the quantity of manure used being forty cartloads of common barnyard manure upon the lot. In 1866, it was again planted with corn and potatoes, with the same quantity of manure. The crop each season was excellent. In April, 1867, it was ploughed to a depth of seven inches, and sowed with oats (upon the furrow,) and then harrowed twice. The crop measured one hundred and sixty-four bushels of good oats, thirty-two pounds per bushel and several bushels of a lighter quality. No manure was used in 1867. The amount of seed used was ten bushels, one bushel of which was Delaware oats, which rusted badly, grew rank and lodged, and were otherwise very much damaged by a flock of thirty hens and turkeys.

From actual measurement, I hereby certify that the land which the above crop of oats covered, contained three acres and forty-one rods, and no more.

B. P. CHADWICK, *Acting Surveyor.*

COST OF CROP.

Ploughing,	$12 00
Harrowing,	5 00
Cost of seed and sowing,	10 00
Harvesting,	13 00
Threshing,	14 00
Marketing,	5 00
	$59 00

THE CROP.

164 bushels of oats,	$164 00	
2½ tons of straw,	45 00	
Total,		$209 00
Cost,		59 00
		$150 00

MIDDLESEX.

Statement of John B. Moore.

I offer for your consideration one bushel of winter wheat; name of the variety unknown to me. This kind of wheat I have grown on my place for the last five years, with uniformly good crops, having twice during that time raised at the rate of more than forty-five bushels to the acre. This year I had just an acre, and have threshed by estimation about one-half of the crop, and there will certainly be thirty-five bushels, and probably more, per acre. I have, by necessity, been obliged to grow it on rather low land for wheat, but have selected such pieces as had a slope, so that there would be no standing surface-water in the winter, which I consider very injurious to the wheat crop. The soil was a strong and rather moist sandy loam. The previous crops had been treated, and were as follows: spring of 1864, grass sod, upon which was spread thirty-five horse-cart loads of green manure to the acre and ploughed in; planted with potatoes; crop quite heavy, but cannot state how much. In 1865 ploughed in another dressing of green manure; planted with sweet corn; crop very good; sold 126 barrels; average price, $2; fed the refuse and stalks to cows. In 1866, wishing to sow to wheat, the first of September I ploughed and seeded to millet about the first of June, without manure, and had a very heavy crop. The last of August ploughed and spread on fifty bushels of leached ashes and two hundred pounds of home-made superphosphate to the acre; sowed one bushel of wheat; ploughed in with a horse plough three inches deep; harrowed; sowed grass seed; covered with brush harrow and rolled down smooth; and this is a sample of the wheat raised. I have since mowed the rowen, of which there was at least a ton to the acre.

I attribute the success that I have had to the following, which I consider necessary conditions: 1st, a good, strong soil, well pulverized and well manured; 2d, no standing surface-water in winter; 3d, a hardy wheat of good quality, and early, so that it will escape the fly; 4th, deep planting, to prevent heaving. Two years ago I harvested the crop the 3d of July; this year about the 12th.

WORCESTER NORTH.

Statement of Luther Page.

SPRING WHEAT.

The crop on this land in 1866 was grass; no dressing used. This year the crop was spring wheat. The soil is yellow loam with rough clay bottom. I broke up from five to six inches deep the last of September; spread fifteen loads of manure from the barn cellar upon the soil; harrowed it well. The last of May I sowed two bushels of wheat which came from Canada, the name of which I do not know; it makes nice bread. I harrowed it in well and rolled it; commenced to cut and stook about August 1st. Raised one and three-quarters tons straw, valued at $14. The piece of land on which my wheat grew contains 160 square rods.

Cost of seed and sowing,	$7 50
of ploughing, &c.,	2 83
of manure,	25 00
of cultivating and harvesting,	9 50
	$44 83
Weight of crop, as certified by W. Baker, Nov. 6,	2,120 lbs.

Statement of Cyrus Kilburn.

WINTER WHEAT.

The crops of 1865 and 1866 on this piece of land were hay; no dressing. The soil is clayey loam. I ploughed in August, 1866, only once, six or seven inches deep; applied sixteen loads of compost manure and about two hundred and fifty pounds superphosphate of lime; manure and superphosphate spread and harrowed in with wheat. On the 27th of August I sowed two bushels of blue-stem winter wheat. I mowed the lodged part, cradled what I could, and reaped the remainder. Raised two tons of straw. The piece of land on which my wheat grew measures one acre.

Cost of seed and planting,	$9 00
of ploughing, &c.,	6 00
of manure,	25 00
of cultivating and harvesting,	15 00
	$55 00
Weight of crop, as certified by Thos. Billings, Nov. 5,	2,040 lbs.

My wheat sells readily for seed or flour at $4 per bushel. I have sowed the blue-stem wheat yearly for twenty years, and there is no deterioration. I raised the same amount on the same acre seven years ago. I find, by experience, that the last week in August or first week in September is the best time to sow. I mowed the above acre six years, then ploughed and sowed on the sod. I think this is the better way to sow. If we wait for the corn to come off it makes it late for wheat sowing. I sow my grass seed on the wheat land in the spring. If it is sown with the wheat it gets the start of the wheat in the spring and chokes it. I wash and lime or ash my seed wheat, thinking it necessary to prevent any tendency to smut, which tendency may possibly be produced by using manure composed partly of chaff of smutty grain. If we sow smut, we reap smut.

Statement of S. R. Damon.

WHEAT.

The crop on this land in 1865 was corn and potatoes; in 1866 it was corn. The dressing used for both these crops was stable manure, twenty-five loads to the acre. Soil, yellow loam. I ploughed once, May 3, seven inches deep; cultivated and harrowed three times; applied twenty loads of manure spread broadcast after ploughing. I sowed, May 9, two and one-half bushels. Cradled the last week in August; stooked in the field till dry. Straw, 34 cwt. The land on which my wheat grew measures one acre, five rods, forty feet.

Cost of ploughing, &c., ...	$8 00
of manure, ...	30 00
of cultivating and harvesting, ...	21 00
	$59 00

Weight of crop as certified by Wm. Baker, Nov. 6th, 2,093 lbs.

Statement of Joseph Goodrich.

CORN.

In 1865 and 1866, the crops on this land were grass; no dressing used. Soil, clayey loam. Ploughed first, September, 1866, from six to eight inches deep; cross-ploughed the following spring; harrowed and furrowed one way. Applied fifteen loads of manure spread and ploughed in; also, two hundred and fifty weight of superphosphate applied to the hill, and about the same of plaster. Planted, May 6th, six quarts seed, called

Carter corn. Cultivated twice with the cultivator one way; hand hoed twice. Cut stalks September 12th, gathered corn October 24th. Two tons stover.

Cost of seed and planting,	$3 00
of ploughing, &c.,	10 00
of manure,	39 25
cultivating and harvesting,	18 50
	$70 75
Weight of crop as certified by W. Baker, Nov. 6th,	6,240 lbs.

Statement of Luther Page.

CORN.

In 1866 the crop was grass; no dressing used. This year the crop was corn. Soil, black loam, clay subsoil. I broke up the land about the 1st of October, six inches deep; harrowed well; applied eighteen loads compost from the barn cellar, broadcast. Planted by hand nine quarts, six or eight kernels to the hill, of eight-rowed corn of yellow and red mixed kind. Cultivated twice, both times the same way; harvested the 5th of October; cut stalks the middle of September. Three tons stover, value, $27. The land on which my corn grew measures one hundred and sixty square rods.

Cost of seed and planting,	$3 00
of ploughing, &c.,	1 50
of manure,	27 00
of cultivating and harvesting,	18 00
	$49 50
Weight of crop as certified by W. Baker, Nov. 6th,	6,240 lbs.

The above acre of corn which I entered for a premium was broken up October 1, 1866, about six inches deep. The following spring I put on eighteen loads of compost from the barn cellar; gave it a good harrowing; furrowed lightly one way only; put a small handful of Bradley's superphosphate in the hill, used about three hundred pounds; hills about three feet apart each way; put from six to eight kernels in each hill;

thinned at the last hoeing to five stalks—I think five better than four.

Statement of Albert Stratton.

CORN.

The crops on this piece of land in 1865 and 1866 were grass; no dressing used. Soil, gravelly loam. Ploughed one-half the last of November, 1866, and one-half in April, 1867, seven inches deep; harrowed and furrowed both ways; applied twenty-two loads barn manure, spread, and two hundred and fifty pounds superphosphate, in the hill. Planted with corn-planter, May 23d and 24th, twelve quarts Carter corn. Cultivated with cultivator and hand-hoe twice; cut stalks the last of September, and harvested 19th of October.

Cost of seed and planting, ...	$3 08
of ploughing, &c., ...	12 00
of manure, ...	58 50
of cultivating and harvesting, ...	20 00
	$93 58
Weight of crop as certified by W. Baker, Nov. 6th,	5,280 lbs.

The field was ploughed part late last fall, the other part early in the spring. I could see no difference.

Statement of Luther Page.

WINTER RYE.

The crop on this piece of ground in 1866, was grass; sixteen loads of manure from the barn cellar was used. The crop of this year is rye. No dressing used. Soil, black loam, clay bottom. I broke up the land six inches deep, the last of September; harrowed thoroughly; spread broadcast, sixteen loads of manure from the barn cellar. Sowed the last of September, one and a half bushels of the white rye; seeded down to grass again. Harrowed thoroughly three times and rolled. Commenced cutting and stooking the 20th of July; carried to the barn the last of August. One and three-fourths tons straw, value, $17.87. The land on which my winter rye grew measures one hundred and sixty rods.

Cost of seed and planting,	$2 50
of ploughing, &c.,	2 00
of manure,	24 00
of cultivating and harvesting,	12 25
	$40 75

Weight of crop as certified by W. Baker, Nov. 6th, 2,400 lbs.

Statements of Cyrus Kilburn.

WINTER RYE.

The crop of 1865 on this land was potatoes, and in 1866 corn. In 1865 ten cartloads of compost manure was used, and in 1866 twelve. Soil, sandy loam. Ploughed once, six or seven inches deep, in September; no other preparation for the seed; no dressing for the rye crop. Sowed the last of September; harvested about the 25th of July. One ton straw. The land on which my winter rye grew measures 159 square rods.

Cost of seed and planting,	$5 00
of ploughing, &c.,	6 00
of cultivating and harvesting,	10 00
	$21 00

Weight of crop, as certified by Thomas Billings, Nov. 5, 1,370 lbs. to the acre.

I had another acre in the same inclosure sowed to winter wheat, and treated in a similar way as to manuring and cropping, and the wheat crop was much more valuable than the rye.

WHITE BEANS.

On this land the crop in 1865 was grass; no dressing was used. In 1866 it was horticultural beans; used two cartloads of composted manure. Soil, gravelly loam. Ploughed once in May, six or seven inches deep; applied two loads compost manure and forty pounds superphosphate of lime. Planted the first of June, in the drill, three quarts of the early white pea bean; pulled and stacked the beans the first of September. Raised four or five hundred weight of bean straw.

The quantity of land on which I raised my beans measures twenty square rods.

Cost of seed and planting,	$2 00
of ploughing, &c.,	50
of manure,	4 00
of cultivating and harvesting,	5 00
	$11 50

Weight of crop, as certified by Thos. Billings, Nov. 5, 183¾ lbs.

I find that white beans planted on a light, sandy loam are less liable to blast than those planted on black, moist land. A blast on the pod occasionally injures the crop.

ROOT CROPS.

WORCESTER NORTH.

Statement of Martin Johnson.

ONIONS.

In 1865 and 1866 the crops raised on this land were onions; the dressing used, horse and hog manure, about twenty-five loads to the acre. Soil, sandy loam; not ploughed but cultivated before planting in the spring; harrowed and levelled with the back of the harrow; used about twenty-five loads of manure to the acre. Planted April 10, with machine, yellow Danvers and another yellow variety, name unknown. I hoed with Wheeler hoe three times, and weeded three times by hand. Harvested the first of October. The land on which my onions grew measured forty-four rods at the outlines; there were sixteen fruit trees on the land, which I think would reduce the measure to about thirty-five rods, there being no onions under the trees. I have measured the onions and have one hundred and two bushels of sound onions; about two bushels are small.

Cost of seed and planting,	$1 50
of ploughing, &c.,	2 00
of manure,	10 00
of cultivating and harvesting,	20 00
	$33 50

Weight of crop, as certified by Cyrus Kilburn, Nov. 6, 5,304 lbs.

Statement of Ebenezer Bird.

RUTA-BAGAS.

The crops of 1865 and 1866 were grass; no manure used. Lightish, gravelly soil; ploughed six inches deep, the 21st of June, after mowing the grass off. Four loads of manure, of fifteen bushels each, and two of thirty bushels, were applied in drills. I planted, the 21st of June, four pounds of ruta-baga seed in drills; cultivated and hoed twice. Harvested, pulled and cut tops the 2d of November. The piece of land where my turnips grew contains twenty square rods.

Cost of seed and planting,	$2 00
of ploughing, &c.,	75
of manure,	2 00
of cultivating and harvesting,	5 00
	$9 75
Weight of crop,	2,745 lbs.

Statement of Abel Marshall.

POTATOES.

The crops of 1865 and 1866 were grass; no manure was used. Soil, black and yellow loam. Ploughed, May 28, five inches deep, with a common plough. Applied twelve loads of manure, spread evenly on the grass before it was ploughed, and then turned under the sod with the grass. I planted, June 1, nine bushels of potatoes, the "Garnet Chili" variety, cut in pieces and dropped in between the furrows as deep as was ploughed. Harrowed once and hoed once. Harvested October 18. The piece of land where my potatoes grew contains forty square rods.

Cost of seed and planting,	$9 50
of ploughing, &c.,	2 00
of manure,	25 00
of cultivating and harvesting,	11 00
	$47 50

Weight of crop, as certified by Cyrus Kilburn, Oct. 18, 2,880 lbs.

FLOWERS.

WORCESTER WEST.

From the Report of the Committee.

Not a home so humble or so lowly but it may claim a flower garden; and the wealthier and more prosperous a people, the more munificent their expenditure upon public parks and gardens. Thus the flower garden becomes a national feature, and with the aid of a stereoscope, we may sit by our firesides and learn its various peculiarities. We find that the English remove the turf from the lawn upon which so much labor and expense has been bestowed, and realize a beautiful effect by the velvet greenness of the grass, contrasting with the brilliant colors of the flowers; the French arrange theirs with gravelled walks, borders, cut trees and grassy slopes; the Italians with marble walls and terraces, fountains and flights of steps; the Spanish with light and airy tressel work; while in tropical India the gardens consist of squares of grass, under protecting shade. Central Park, in New York City, combines in its immense area, the spacious lawn, the parterre of flowers, the Chinese pagoda, the tresseled arbor, flights of marble steps, fountains, caves, shaded retreats with flowers and shrubs and trees from each zone and every country, and in its whole magnificent adornment, aims to copy nature. Its beautiful rock-work suggests to our Worcester County people how its many rocky localities, now repelling and forbidding, may be made elegant by labor and taste. The scraping of the rocks, the filling of crevices with strong, rich soil, the planting of columbines, ivies and flowering vines, converts these rough places into charming ornaments.

One element of the perpetual pleasure of floriculture is its progressive character. The flowers that claim popular attention this year of 1867, thirty years ago were scarcely known, or the changes produced in them are so wonderful that we barely recognize them.

Humboldt, the learned and noted traveller of the last and present century, found in the year 1785, on the table lands of Mexico, a pale, purple flower, of coarse appearance, with an unpleasant odor, whose large tuberous roots were only edible to the natives, but which was interesting as a new form of floral structure. This flower, belonging to an order numbering ten thousand species, received the name of Dahlia, in honor of the Swedish botanist, Dahl. It has had a most remarkable success, two thousand varieties being now enumerated, and the changes produced in it have been splendid and brilliant, although the blossom is set and prim, the leaves coarse, and the odor continues disagreeable.

The gladiolus is now a leading flower, and the catalogues announce hundreds of varieties, where a few years since only three were known, and those of no pretensions.

The asters are old favorites, and will continue to be cultivated in every collection ; they have been, and are constantly being improved, and finer varieties are known than are offered at our annual fairs.

In this vicinity we have a great abundance of wild flowers, which for variety and beauty are worthy of careful search. In the month of September we have nearly a hundred species, of which the wild asters, the golden-rods and the gentians are the most numerous. Many of them richly repay cultivation, and are easily naturalized. The wild honeysuckle increases the number and size of its blossoms so greatly by culture, that it becomes elegant. The unrivalled scarlet cardinal flower, the purple gay-feather, the blue fringed gentian and the primroses are known to bear transplanting, and improve by the change. The common red lily of our pastures, now showing but one flower, by rich culture will produce ten, and the yellow meadow lily twenty, in place of three or five.

What an ample field for the professional florist or the amateur, and how truly worthy their labor, enthusiasm and love! Flowers! beautiful flowers! We thank our Heavenly Father that they are everywhere, and that all may love them and learn from them the sweet lessons that

> "Will lead us from earth's fragrant sod
> To hope and holiness and God."

Like the gentle dew, their influence falls upon all, of every age and station. We find them in the deep forest, and on the dusty road, in the parlor and in the garden, and in every spot on this wide earth consecrated by human joy or sorrow.

> "Bring flowers! They are springing in wood and vale,
> Their breath floats out on the southern gale.
> Bring flowers to strew in the conqueror's path,
> He hath shaken thrones with his stormy wrath!
> Bring flowers to the captive's lonely cell,
> They have tales of the joyous woods to tell,
> And a dream of his youth—bring flowers, wild flowers.
> Bring flowers, fresh flowers, for the bride to wear,
> They were born to blush in her shining hair,
> She is leaving her home—bring flowers, fair flowers.
> Bring flowers, pale flowers, o'er the bier to shed
> A crown for the brow of the sainted dead!
> They are love's last gift—bring ye flowers, pale flowers!
> Bring flowers to the shrine where we kneel in prayer,
> They are nature's offering, their place is there!
> They break forth in glory—bring flowers, bright flowers!"

PLYMOUTH.

From the Report of the Committee.

In the beginning plants lived, blossomed, and passed away, leaving their imperishable records on the rocks to demonstrate their existence, probably a million of years before man was created. Geology teaches us that for ages *vegetation only* lived to prepare minerals and food for our use. Burning with heat, saturated with moisture, and charged with deleterious gases, as yet the world was in no condition to receive man, and it was by the agency of plants that these apparently insuperable objections were to be removed. Not in the twinkling of an eye, but by immutable laws working for ages, was the result to be accomplished. With the sea teeming with animal life, at whose death continents were to grow, other continents elevated from the ocean were covered with a gigantic vegetation, unknown at the present time except in the tropics, and to-day we see the result, in coal-fields scattered all over the world. The earth and waters cooled, the air we breathe assumed the present form, when God's most perfect creation, *man*, came forward to assume dominion.

Previous to his being called to be master of the world, God prepared a place for him to dwell, and here at the creation we have an example set us by the Architect of the Universe. The first impression to be made on man, was to be in, and come from a garden. About to be the progenitor of a race formed in the image of the Almighty, it was decreed that his bewildered vision should first behold God's creative power, wisdom and love in flowering plants, whose perfect beauty, first unfolded in a sinless world, should from that time to the present exercise such a singular and marked influence on our whole lives. Sacred and profane history abound in descriptive passages in which flowers take a prominent and leading part. Even the brilliant magnificence and wondrous splendor of Solomon was eclipsed by a lily, who "was not arrayed like one of these." But it is only when we call the microscope to our aid, that flashing on our perceptions, we see tints that no artist can produce, lines that no engraver can copy, and we behold living, pulsating vessels in vegetable life. Destined to play so important a part in the economy of nature, we see them covering every part of the globe; reaching from the icy north to the torrid zone, from the valley to the mountain top, we find flowers scattered with a beautiful profusion, each in the locality best adapted for its perfect development. Nothing was made in vain; all were pronounced good. Flowers are never out of season and never out of place. A welcome and charming gift at the sick bed, indispensable at the bridal party, as emblems of purity and beauty, a gift that can never offend, they admonish us to walk uprightly, for like them from dust we were formed, so like them shall we blossom in immortality.

Probably most of the farmers of Plymouth County would be surprised when told that the sales of flowers in the United States yearly amounts to over $3,000,000, Boston selling $200,000, and New York over $400,000 per annum. Plymouth County pays over $5,000 per year for flowers. Two to three hundred dollars are quite commonly expended in cities for floral decorations, for weddings, funerals and parties; and at a reception in New York a few months ago, $1,500 were expended for these indispensable, beautiful, fragile creations that graced the rooms. Their influence on our lives, so marked in its character, conduces to the best results. In the past we see it in the architecture of the ancients, in the ruins of their temples, finished thousands of years ago, copies of living vegetation, carved with a correctness that finds no rival to-day. Man first got his crude ideas of building from trees. We pride ourselves on our smartness, but from the dusty records of the past might we not learn a lesson? *We* copy from others. They copied from nature. Flowers they worshipped, and in so doing they looked from nature up to nature's God.

This beautiful, Christianizing influence is felt in community in many ways. Education, the culture of flowers, exquisite taste and refinement of character, go hand in hand. Who ever saw an untidy house with flowers in the window? The instance is not known of a person thoroughly bad who loved flowers. The good and the beautiful are inseparably connected. Farmers of Plymouth County, why do your sons leave the homestead so distasteful for other occupations? Why do they behold visions of ease in the merchant's or manufacturer's residence, and look forward to the time when they, too, shall be gentlemen? It is because they have a false idea of the farmer's vocation. The surroundings are repulsive, not necessarily so, but from habit that prevents expenditures for anything that will not sell. The farmer's profession is the most noble and elevating one on earth. Man was created a farmer. He cannot live in health unless he tills the soil. He need not emulate the beast in labor, and so unfit the mind for intellectual culture. Intelligent labor, with modern machinery, should shorten the season of severe labor, and give more time for mental improvement. Go to the city. The merchant, weary in his counting-room, and fearful lest some midnight robber should deprive him of his stocks and bonds, seeing nothing but brick walls on every side, sighs for pure air, for pastures green, and flowers. He remembers with pleasure the girl that brought him roses at school when a boy, and looks forward to the time with inexpressible longing, when released from business, on a farm in the country, surrounded by fruits and flowers, he can spend the remainder of his life in cultivating these first and best gifts of God to man. As a rule, flowers on a farm are *tolerated*, many times to keep peace in the family, very seldom to be shown as a feature, like blooded stock, the fields and the wood-lot. This is radically wrong. Let the farmer's home be pleasant—a well-filled library, with pictures on the walls, to provide entertainment for minds *always hungry*. Above all, let the arrangement of the grounds and the flower garden be a prominent feature, that the eye may ever behold it with delight, leave it with regret, and always return to its protection with a new pleasure. Besides—let me whisper it—YOUR FARM WILL SELL FOR MORE. The ameliorating influence of horticulture and floriculture on the character is always underrated and sometimes entirely overlooked. There is a love for the beautiful in every person created, and if latent it should be developed.

There should be a slight modification in the premium list—bedding plants grown in pots not being entitled to premium, as understood by the Committee. I have prepared a revised list that I think will be acceptable to those exhibiting, and making the duties of the next Committee less arduous. There should also be some arrangement whereby exhibitors from a distance can have accommodation. All the space being filled the day before the exhibition, bushels of flowers were not and could not be exhibited for want of room. Bringing plants for sale, unless entered for premium, should be prohibited. There has been a marked improvement both in the amount and character of the floral display for the past few years. *The most attractive part of the whole exhibition, at once pleasing and refining, it should be zealously fostered by the trustees.*

For the Committee,

L. W. Puffer, *Chairman.*

MANURES.

ESSEX.

From the Report of the Committee.

The question how can the farmer maintain and increase the fertility of his fields, and also secure an annual remunerative crop, is one of paramount interest to every cultivator of the soil, and at the same time difficult to answer. The result of the carefully conducted experiments before alluded to, and many others which, after the ice was once broken, were made public by modest experimenters, who did not care to stem the flood-tide of popular advertisements and endorsements of the various nostrums for securing universal fertility is, that they do not answer the desired end. What little fertilizing quality they possess will not pay the cost of them. We mention, for instance, the flour of bone. No one questions the great fertilizing properties of bone, but that the flour of bone is in a condition to be immediately assimilated by plant growth; it therefore fails to answer the purpose required of it. Hence the farmer who earns his money cannot afford to pay the high price demanded for it when he can buy the pure unground bones for one-third the price, and reduce them at a small expense to a condition readily assimilated by all plants.

Mr. Henry Coleman uttered a valuable truth when on being asked, "What has chemistry done for the farmer?" he replied that it had dissolved bones by sulphuric acid.

Nor is it for a moment questioned that Peruvian guano is a very valuable specific fertilizer, but as a general thing its high cost places it beyond the reach of the practical farmer. Fish pomice or guano, is sold at a comparatively low price, is unadulterated, makes a valuable compost, and may perhaps be afforded. Many of the articles offered in our markets as fertilizers at high prices, recommended as being entirely inoffensive to the most fastidious, may be well adapted to those who would farm with kid gloves on, and to such only can we recommend them.

What then are the resources of the farmer for manure? We answer—the barnyard, the stable, the privy, waste animal and vegetable material, whether grown upon the land or in the sea, all of which should be husbanded with the utmost care, their volume and power multiplied by composting with peat, loam, and in some cases sand. As much poudrette can be made from a single load of night-soil by composting it with meadow mud or muck, as can be purchased for twenty-five or thirty dollars; and of as good quality. Sea manure, consisting of kelp and the various sea mosses, or rock weed when mixed with an equal quantity of muck, will make a compost equal in quality with the best stable manure. The farmer having secured as great a quantity of these materials as possible, has yet another resource, unlimited in extent, easy of access, and with the materials already at hand, may increase the fertilizing capacity of his manures immensely.

Chemistry informs us that plants are enabled to absorb large portions of three of the four organic elements which constitute them, through their leaves, viz., carbon, oxygen and hydrogen, while the fourth, nitrogen, though constituting four-fifths, of the surrounding atmosphere, is not thus absorbed, as has been proved by careful experiment; but must be supplied through their roots. According to the estimate of a careful chemist, three-fifths of the value of barnyard manure is the nitrogen that it contains. Now the question arises, how can the farmer within his own means, draw from the never-failing fountain that nature has so generously provided, and appropriate to the growth of his crops. It is well-known that nitre or saltpetre is manufactured by composting animal and vegetable manures with loam, meadow muck and other earthy substances. In short, a good thorough compost heap, well worked, will accumulate nitric acid from the atmosphere in proportion as it is worked over and exposed to it. France has in time of war manufactured two thousand tons of saltpetre annually in this way. Why not make the same effort to promote the peaceful art of agriculture? An economical, and it is believed a successful method of accomplishing the same end, is to apply the manure made during the summer, directly to the land, and ploughing it in after harvest, and then ploughing twice in the spring before planting, thereby making a nitre bed of the whole surface of the field. This process seems to be justified by the principle upon which every good farmer composts and pitches over manure to increase to the utmost its fertilizing power. This method would not be advisable on what is called leachy land, but on other soils it has been practised with much success. Some of the largest root crops ever known to your Committee, were grown upon land where this method of applying manure in the fall was pursued. The object of the Committee at this time, is not to treat this great subject at length, but simply to draw attention to a few important points.

Benjamin P. Ware,
Henry Hobbs,
Committee.

NANTUCKET.

Statement of James Thompson.

I enter for premium the five pens of manure at my Groveland stock farm. On the 15th of last May all the pens were cleaned out. We then commenced to cart in seaweed, sods from rich ridges where fences had been, and peat mud, with the droppings of four cows, one horse and one bull, with an average of six hogs. Two months of the latter part of the time two sows have had eleven pigs. In the eight months there have been, as near as we could keep the run, thirty loads peat mud, fifty loads seaweed, fifty loads sods, and all the refuse bedding and green matter that is around the farm. In addition to the droppings above mentioned, the cost is about as follows:—

For 30 loads peat mud, at 10 cents, ...	$3 00
50 loads seaweed, at 35 cents, ...	17 50
50 loads sods, at 15 cents, ...	7 50
	$28 00

The value of the droppings from the animals we cannot estimate, and the sods, peat and seaweed have been hauled at such odd times that the man and horse would have done but little else in the time. There are now (as consolidated,) about 2,700 cubic feet of manure, of as good quality as I should have to pay one dollar per load for. By allowing twelve cubic feet for a load, we have two hundred and twenty loads of twenty bushels each, at a cost of $28, aside from the droppings of animals.

The question is asked, "How was it possible to make so much manure in the past eight months?" I answer, from several causes. First, by stabling all cows and horses at night, and by carefully saving all refuse matter that is usually thrown aside, forming unsightly heaps. When you look around my farm you will see everything that can rot is cleaned up and put into the hog or manure pens. By thus saving, at a cost of but little time, every farmer can make a hundred loads more manure yearly than he usually does. I hear him say, "I can't stop to collect all those matters; they don't amount to much, anyhow." I say, collect every turnip-top, green weed and animal dropping, and at the time of planting or top-dressing grass lands you have increased the year's crop five tons of hay, or fifty bushels of corn, and one hundred of roots. Will you not have been well paid for the labor expended? If you are still an unbeliever, go and see my manure pens.

AGRICULTURAL IMPLEMENTS.

ESSEX.

From the Report of the Committee.

No subject should receive more attention from those interested in progressive agriculture than farm implements. It lies at the very foundation of all improvement. We may have new fertilizers, new modes of applying them, and increased products; but the cost of tilling and harvesting must be kept down by the use of labor-saving machines, or there will be little or no profit. So with the hay crop, for example—every implement that facilitates cutting, curing and gathering tends to make the crop more remunerative.

The greatest outlay on a farm now-a-days is for wages. To a great extent these must correspond to wages in other occupations or our farms will be deserted. And yet every farmer—we do not include market-gardeners—well knows that he cannot pay extravagant or even comparatively high wages and make both ends of the year meet. Hence he is greatly interested in the substitution of horse power and steam power for man power; and where this can be effected on the farm, it is no detriment to the latter, as there are always other avenues in this country for its profitable employment.

In the West, where farming is carried on on so grand a scale, horse and steam power and improved implements and machinery are used to an extent to which we in New England are unaccustomed. With them it is a necessity, or their work could not be accomplished. Our farms and crops are so small we do not so generally feel this necessity. We can "rub and go" with the same tools that our fathers used, but then we make no headway either in filling our barns or pockets. Thus it is that so many complain of farming as a poor business, and they always will complain till they set their brains at work to devise the means to help their hands.

But we are not obliged to invent new implements ourselves; we have only to select from those already invented, or which are constantly invented to meet the wants of the farm. True, it costs considerable money to get these implements; but the first cost is not the question. The question is whether it will be a good investment. Again, you fear to buy lest a better implement will shortly be introduced, and you will wait for that. But, by the same rule, when that comes, you will wait for its successor, and so on, till you miss your opportunity. So fares it with some farmers, and you can easily tell whether they are among the most thrifty. Others run to the opposite extreme, buy every new implement that comes along, and have a good deal of useless machinery to fill their sheds. Of course there is discretion to be exercised here, as in other things, and by it you must direct your path.

Of implements of acknowledged utility, we say, in the words affixed to the advertisements of Webster's dictionary, "Get the best." Depend upon it, the best is in the long run the cheapest. Only be sure to use and house your tools carefully. As a general thing you will be more likely to do this if you buy the best than if you buy the cheapest. Yet we would not be understood as claiming that high cost is an infallible guarantee of the best quality. There may be fixtures about tools, as well as tools themselves, that are more ornamental than useful. A farmer needs to have his eyes open when he is shown a churn, for example, that has a variety of arrangements by which it is asserted that butter can be churned by a small child, and that, too, in five or ten minutes. He may be wheedled into a purchase, but after a few trials he will be no more proud of it than Franklin was of his whistle.

A farmer, of all men, needs to have a wise caution in purchasing things that promise large results. He must look into them for himself, or must rely upon the judgment or experience of others who have tested them. If he takes only the word of the vendor, or the certificates of persons unknown to him, he will be liable to be swindled, as some in our county have been this very season.

With reference to new implements, it may truly be said that one trial will not fully test them. "One swallow does not make a summer," is a good adage for farmers. Many new agricultural tools, like new brooms, work well at first, but before long one defect and another come out where you little suspect it, and unless it be remedied they must be abandoned. Pope's very conservative rule with regard to fashion might perhaps be recommended in the use of farm implements,—

"Be not the first by whom the new is tried,
Nor yet the last to lay the old aside;"

only we should be glad to know, if everybody adopted this rule, how any improvement is to be introduced? There must be a first one to try every new thing, and generally it is the most enterprising and thrifty—sometimes, too, the most notional—who is ready and willing to do it. And the whole farming community are under obligations to such men—men who at great expense of time and money, and sometimes at the risk of prejudice and ridicule, go forward with a new horse-mower, or a horse-rake, or hay-tedder, and by their example revolutionize their neighborhoods. All honor to such men! They are benefactors of their race! Let the Essex Agricultural Society ever encourage such men by prompt and appreciative attention, and by a liberal award of premiums.

At an exhibition of agricultural implements the committee labor under a difficulty in making their awards. It is seldom they can assign reasons for their preference of one implement over another of the same class, founded on a trial of them on the spot. They must rely, therefore, on a careful inspection of the implements and such reliable testimony as they can gather from those who have used them. And this, with a single exception, is all we have been able to do on the present occasion. We award the premium of ten dollars for the best mowing machine to Whittemore, Belcher & Co., of Boston, for Wood's new jointed bar mower.

PLOUGHING AND DRAINING.

WORCESTER NORTH.

From the Report of the Committee.

Before speaking of the subject of ploughing, we would allude to another that underlies it, to wit: field draining. As food enters all plants through the medium of water, a proper regulation of it is of paramount importance.

Rain water is not only a powerful solvent, but it extracts ammonia from the atmosphere which increases and elaborates those elements of fertility in the soil on which vegetation depends for health and fruitfulness. We quote the following from Mr. French's "Farm Drainage." He says: "Although we usually regard drainage as a means of rendering land sufficiently dry for cultivation, that is by no means a comprehensive view of the object of the operation. Rain is the principal source of moisture and a surplus of moisture is the evil against which we contend in draining.

"But rain water is also the principal source of fertility; not only because it affords the necessary moisture to dissolve the elements of fertility, but also because it contains in itself, or brings with it from the atmosphere, valuable fertilizing substances.

"About forty inches of rain water may be taken as a fair general average of the rain-fall in the United States. If this supplies as much ammonia to the soil as three hundred weight of Peruvian guano to the acre, which is considered a liberal manuring, and which is valuable principally for its ammonia, we at once see the importance of retaining the rain water long enough at least upon our fields to rob it of its treasure. But it has a further value than has yet been suggested: 'Rain water always contains in solution air, carbonic acid, and ammonia; the two first are among the most powerful disintegrators of the soil; the oxygen and carbonic acid being both in a highly condensed form by being dissolved, possess very powerful affinities for the ingredients of the soil; the oxygen attacks and oxidizes the iron, the carbonic acid seizing the lime and potash and other alkaline ingredients of the soil, produces a further separation and renders available the locked up ingredients of this magazine of nutriment; before these can be used by plants they must be rendered soluble, and this is only effected by the free and renewed access of rain and air. The ready passage of both of these, therefore, enables the soil to yield up its latent nutriment.'

"Hence, we see that the rains of heaven bring us not only water, but food for our plants, and that, while we would remove by proper drainage, the surplus moisture, we should take care first to conduct it through the soil far enough to fulfil its mission of fertility. We cannot suppose that rain water brings to our fields precisely the same proportion of the elements of fertility, because the foreign properties with which it is charged must continually vary with the condition of the atmosphere through which it falls, whether it be a thick and murky cloud which overhangs the coal-burning city, or the transparent ether of the mountain tops."

Now the question arises, What lands need drainage? Evidently those lands that retain the surface water until late in spring or early summer, so that teams cannot work upon them to good advantage, require at least, superficial drainage; it is frequently necessary as well as convenient, to be able to cultivate a field a week or ten days earlier; by so doing the extra crop in one season would, in many cases, pay the expense; fields that are known to grow willows, rushes and alders indicate deep drainage, as these aquatic plants would not grow and flourish were it not for the water in the subsoil that encourages their growth; again, where trees or grain leave badly in spring, or when the foliage presents a sickly appearance, it is a strong index of stagnant water in the subsoil.

A member of this Committee having decided to transplant a pear orchard at some future day, and having learned that the roots of pear-trees have a great aversion to standing water, the field was first drained as was supposed, sufficiently; but to make a sure thing of it, about one year ago a shaft three feet deep was sunk in the field and stoned in the form of a well, and the movement of the water noticed during the winter and spring following. Now, as the water at the highest point was found to rise only one and a half feet, and to remain at that height not more than forty-eight hours, it is conclusive that pear-trees may be transplanted with safety. As the expense is small it may be a safe criterion for other plants.

THE PLOUGH.

Of all implements used upon the farm, the plough stands first and foremost; yet, strange to say, that, in the majority of cases, its use is not yet appreciated. It is also equally strange that we find so many young men at the present day so totally inefficient in this work. If a farmer has a field that requires anything above and beyond mere superficial ploughing, he is himself obliged to take the plough into his own hands, or call upon some middle-aged or old man to perform the task, otherwise be satisfied with very inefficient ploughing. It has been truthfully said that it requires more mechanical skill and ingenuity to govern, gauge and give proper draft to the plough, than it does for the mechanic to build one. And all this must be acquired from practice and observation, and taking an interest in the work; and to this end your Committee would recommend a higher rate of premiums, and a greater number; make it an inducement for our young men and boys to present themselves in the field and compete for the premiums.

In preparing a field for a corn crop many plans are suggested and as many adopted, but in the minds of your Committee, who have had some experience and made some experiments, we would adopt the following, not only for the corn crop, but for those crops that follow: turn the sod in August as light as it can possibly be done, say three inches deep, and before the "setting in of winter," turn the furrows back or "tilt them up edgewise"; by this process the action of frost in winter and the thawing in spring causes the sod to yield easily to the harrow; the field is now ready for thorough ploughing, which should be done on our best lands with a heavy team equal to that of four oxen; and for very good reasons the swivel or side hill plough should be used, whether our fields are side hill or comparatively level; by this operation our fields are left without dead furrows, and are made level and in good preparation for the horse mower, which very useful farm implement is fast coming into use. If the field has never before been ploughed more than six inches, it is now the proper time to sink the plough to the depth of seven or more inches, thus giving the surface soil one inch more of depth, which is in effect, adding about one hundred loads of thirty bushels each; this may be considered sufficient both for the corn crop and for those crops that follow for the next seven, eight, or ten years, as the case may be.

The use of the subsoil plough, we believe, would prove a valuable acquisition to many of our fields; the operation is expensive but effectual in the end, as in field drainage; it requires the same amount of team and the same time to subsoil a field as it does to plough a grass field seven inches deep on our best grain and grass lands—that is, in soils where it can be used; it serves to loosen the soil to almost any desirable depth, thereby making a pasture ground for the smaller roots to feed upon. It has, heretofore, been the popular doctrine that cereals did not extend only a few inches below the surface. But this theory now being strongly confuted by those that have examined it, it is pretty well conceded that the roots and small fibres extend several feet. Hence, if this theory be true, it is manifest that by loosening and pulverizing the soil to the depth of one and a half feet or more, it will produce a much stronger root and stalk, consequently a greater yield. In case, however, where field drainage is necessary, and the work has not been done, perhaps subsoiling in many cases would not be effectual, as this treatment would serve to make channels in the subsoil, and cause the stagnant water to remain, or not find so ready passage as it otherwise would have done, and thereby making the soils more pernicious to the plant.

The more effectual method of preparing the soil for plants, doubtless, is by spading; but this mode of cultivation is far too expensive to warrant the outlay to a very great extent, except to that class of farmers that have a floating capital and are satisfied in adopting the principle of sowing dollars and reaping dimes, perhaps for a series of years. Yankees generally favor the maxim of quick returns, although the profits are small.

If green sward is to be turned up for winter wheat, it should be ploughed in August with a good team and an expert ploughman; the soils should not be turned at a less depth than seven and a half inches, and the furrows laid as flat as circumstances will permit; that is, the furrows should not lap upon each other, as this would cause extra labor in making a smooth surface. About twenty-five loads of compost manure incorporated with seventy-five or one hundred bushels of leached ashes or its value in some other fertilizer, will produce an amount of wheat equal in value to seventy-five bushels of corn; by turning the sod to a proper depth, or about an inch deeper than at former ploughings, we have a surface soil of seven or eight inches; the manure and fertilizers produce a strong growth of the young plant in the autumn after sowing; and as the roots of all grains extend to comparatively great depths below the surface, in the course of the next summer they find a rich pasture ground in the sod that is constantly decaying to feed upon; besides, through the influence of solar heat there is constantly a "sucking or drawing up" of the nourishment of the decomposed vegetable matter that encourages the growth of the young plant.

We recommend comparatively deep ploughing in all cases, in order to give a deeper and more friable soil for the small rootlets to make their researches. It is noticeable in fields where the stumps of trees have stood for a long time, and where we should expect to see the stronger plants, we notice the very opposite, and the cause may be attributed to inefficient ploughing. If spring wheat is to be sown "on stubble," we recommend not only deep but frequent ploughing; a thorough pulverization of the soil, and the last ploughing to be cut so fine that the field may have the appearance of being harrowed.

The writer of these remarks became satisfied of this operation from being obliged to plough a field three times in consequence of frequent rains in spring, where one ploughing in the majority of cases would have been considered sufficient; the result was, when it became time to cultivate and hoe the field, with a very little effort upon the handles of the horse hoe, the teeth or cutters could be penetrated into the soil to the depth of the wood work, and the whole field was very similar "to an ash heap," or garden mould. *A deep pulverization* of the soil is necessary to the germination of the seed and the ready extension of the roots, to the free circulation in it of moisture and air and the admission of solar heat, all combining to prepare and transmit food to the growing plant. If the soil is lumpy or coarse, and does not come in close contact with the seed to keep it moist, the seed cannot germinate; the roots cannot freely extend in search of food, nor can this food be properly prepared and transmitted to the plant unless the soil is so pulverized as to permit the free circulation of air and moisture through its interstices and through its mass. The air and dews are charged with elements of fertility, and the more freely they are permitted to penetrate the soil the more benefit they will impart to the crop.

For the Committee,

E. Graham, *Chairman.*

STOCK.

MIDDLESEX.

From the Report of the Committee.

Three herds were on exhibition: one of the three, that of Winthrop W. Chenery, Esq., having once taken the society's premium, was entered simply for exhibition. It might be deemed superfluous for your Committee to speak particularly of this celebrated herd. It is too well-known throughout the country to need comment at our hands. What the owner claims in regard to the superior qualities in this rare breed seems to be clearly admitted by the community, as the increasing demand for them at enhanced prices fully proves.

The other two were entered for exhibition and premium: one by Mr. Francis B. Hayes, of Lexington; the other by H. M. Clarke, Esq., of Belmont. It was somewhat difficult for your Committee to come to a conclusion satisfactory to their own minds in regard to these very creditable herds. That of Mr. Hayes was composed of eleven pure blood Jerseys, one splendid cow, seven-eighths Jersey and one-eighth Durham, besides several Dutch grade heifers and a pair of oxen.

The Jerseys were, for the most part, finely bred animals from some of the best herds in the country, and they show their blood distinctly and the good taste of the owner in their selection and breeding. If the feeding and care taken of some of them had been equal to their breeding, they would have presented even a better appearance. The calves had evidently been overfed with grain. Taking into consideration the number of animals, together with the quality of this herd, your Committee award it the first premium of prize diploma and $30.

Mr. Clarke's herd was all pure Jerseys, well bred and in high condition, showing skill and good judgment in the selection and breeding as well as in the care taken of them. The bull "Champion, 2d" is a credit to any herd: such an one as Mr. Motley, or other celebrated amateur breeders, would select. The cows are handsome and very rich milkers, demonstrating very clearly the superior butter-making qualities of the Jersey breed. The cow "Beauty" has few equals; combining as she does elegance of form with a remarkable product. For this herd Mr. Clarke was awarded the second premium of $25.

It is gratifying to notice that so much attention is being paid in the county to this breed, unquestionably superior to all others in the production of one of the greatest of all luxuries, namely, rich milk and butter. This fact has long been known in England, as shown by the value placed on the animals there, and the comparative price paid for their product. It is also fast becoming known in this country, as proved by the increased value of the animals here, as well as by the price that their products will command. The milk, the cream, and the butter, if delivered pure, will find plenty of customers at about double the price paid for any other. In view of these facts, we argue that the farmers who produce not only for their own use, but for the market, may find it to their advantage to introduce more generally this breed among their herds.

For beef and working oxen, to be grown upon the broad acres and rich soil of the West, the Holstein or Durham should undoubtedly take the lead. But for rich milk, cream and butter, to be produced upon New England soil, the Jerseys should unquestionably be ranked the highest.

For the Committee,

James C. Converse, *Chairman.*

MIDDLESEX.

Statement of John W. Adams.

I offer for the society's premium my grade heifer, "Kathrina," three years old.

My method of raising calves is as follows: They are taken immediately from the cow and taught to drink, first, warm milk directly from the mother, four to six quarts per day, and continued about a month; then about a great spoonful of rye or oil meal with a handful of shorts is thrown into a pail, boiling water poured upon it (frequently a very little salt thrown in,) cooled off by the addition of a quart of milk, and water enough to make three quarts of drink of about the temperature of milk right from the cow. This is given, morning and evening, to each calf, and continued for two or three months; then gradually withdrawn, and a little dry shorts, or meal, and roots are substituted. It seems to me to be necessary, in order to have good and thrifty animals, that during all the time of raising, and ever after, either good grass or English hay should be accessible. This last matter I deem of vital importance; for no more can a calf be starved, or given barely enough to live on, with impunity, than can a child. I would add, also, that gentleness and kindness, without too much petting, should always mark your dealings with the brute creation.

This heifer was raised by myself. I have owned her dam and grand-dam, both of whom were extra cows in quantity and quality of milk.

WORCESTER SOUTH.

From the Report of the Committee.

COWS, HEIFERS AND BULLS.

Ayrshires.

It is conceded that the cow affords more luxury to man than he derives from any other source. Without her, berries and milk, strawberries and cream, the fine cheese and the golden butter, would never grace our tables. Without butter our beefsteak would be indifferent. Our vegetables we should think unpalatable, our toast tasteless, and our bread unbuttered we should hardly think we could eat. But with butter it forms more than half of man's living. Then if milk and its products are the luxuries of man, the great question arises, how this can be produced in the greatest quantities and still be rich in quality.

Within the past fifty years great progress has been made in perfecting the good qualities of the cow. Then, one that would give 1,000 quarts in a year would be a fair cow. Even now, nine-tenths of the cows in the rural districts do not average more than 1,500 quarts in a year. But these are not profitable to the farmers. We should not be satisfied with less than 3,000. This may look large, but we have cows in the State that have given 1,000 quarts in thirty days, and probably give nearer 5,000 than 3,000 in a year. Youatt estimates the annual yield of an Ayrshire cow at 3,400 quarts; Aiton sets it much higher, and says that thousands of Ayrshire cows give 4,000 annually, beer measure. One of the four cows originally imported into this State by J. C. Cushing gave in one year 3,864 quarts beer measure, and another made her sixteen pounds of butter a week on grass alone. It is conceded by all farmers who have had any experience in the different breeds, that an Ayrshire cow generally gives a greater return in milk for the food consumed than any other breed of cows. We will now make a few figures on profit and loss. A cow that gives only 1,500 quarts a year, will, at five cents a quart, yield an income of $75, which will leave but little profit after taking out the keeping. The one that gives 3,000 yields an income of $150, while one that gives 4,000 yields an income of $200, or a net profit of $125 over the first. But allowing that we give this one $25 worth of extra feed, then we have $100 left, and a profit of $1,200 on a dairy of twelve cows, an item which would satisfy any of our farmers.

The question now comes, how shall we obtain such cows? It is conceded by breeders that a cross of native cows with an Ayrshire bull produces nearly as good milkers as full-bloods. Then all you have to do is to select the best cow you have and put her to a full-blood Ayrshire bull, and if she has a heifer calf with a small and long head, eyes not large but dark and lively; neck long and slender, tapering towards the head; shoulders and fore-quarters light and thin; hind-quarters large and broad, with skin loose, thin and soft, raise it; but if it has not most of these points, reject it and try again, and in a few years you will have a dairy that you will be proud of, besides giving you a well filled purse. To succeed well there are two things more which should have been included, viz., proper care and feed. By proper care I have reference to the habit farmers have in letting their cows be out in cold, windy or stormy days. I have seen cows stand all day in a March wind without any protection. Let a man stand there so many hours and it would unfit him for labor for a week. In relation to feed, farmers often turn their cows out on a frosty morning to eat frozen grass, or eat old fog, and, so long as this bloats them up and makes them look full, they think they have feed enough. Cows should never be turned out on a frosty morning, but should be fed in the barn; and whether cold or hot, after the grass has been spoiled by frost, they should be fed daily in the barn and kept up all cold days, and thus keep up their health and flesh, otherwise they will soon lose all they have gained during the summer.

L. W. CURTIS, *Chairman.*

FRANKLIN.

From the Report of the Committee.

We have uncultivated or half-cultivated land enough in this county to employ every man and woman and child in improving it profitably, and it is altogether too late in the day to say that farming "doesn't pay," and pay better too on the average than any other pursuit. But whatever may be the necessities of the professions and all other callings outside of ours, no boy or girl is so well fitted to act well his part in them even, as he or she who has been well brought up on a farm, taking an active part in all its labors, in-doors and out, till fifteen or sixteen years of age. Then let us induce them by all means in our power, to engage in this most honorable and independent calling. As our able and honored predecessors say in their report, "give the boys each a pair of calves, a lamb or colt, and let them see what they can do." We happen to know of a case to the point, in our vicinity. A boy only eight years old, was given a beautiful pair of steer calves (Herefords,) costing at a week old, five dollars, by his father, being told he might take care of them, feed, break and train them to his heart's content, and when they came of age to sell, a moderate price should be deducted for pay for keeping, and the balance he might lay in the savings bank to pay his tuition at college or do some other good with. He took great delight in rearing and training and showing them, and at a little less than four years of age, he sold them for $300, full $100 more than they were worth for beef, settling readily with his father by paying him their value for beef ($200,) and putting in the bank $100, the pay for training, and is now enlarging his operations by breaking two pairs of the same sort.

Now, the gist of the matter is, don't let our boys and girls learn from us that we are ashamed of our business, that farming is degrading, dirty work, and that we long for some higher sphere in which to move. But contrawise, let us show them that we love our calling, that we will ennoble it and honor it, that we do not desire to exchange the farm and its toils and its independence, for any of the tempting professions, the "glittering generalities" which so easily take with children and *weak-minded* men.

Let us train them to habits of industry and perseverance, keeping them tame even by hard work, thus qualifying them for any pursuit in life, so that if you would have the very best ministers or merchants, doctors or lawyers, let their first fifteen years of service, if possible, be under the instruction of good old dame agriculture; then when the Lord calls upon us for a minister, a king, a president, as He always does when He *takes his pick*, why then "let 'em slide"—give them up of course.

Of thoroughbred Shorthorns, the show was meagre, less in number and inferior in quality to last year, while other breeds were in excess of other years. A beautiful Ayrshire, owned by J. S. Grennell, our former secretary, the first ever exhibited at our fair owned in the county. The thanks of the society are due our worthy friend for his efforts to introduce this valuable breed of cattle into the county. Of Herefords, two good animals worthy the premiums awarded them. Too much can hardly be said in favor of this breed of cattle; crossed with our large, coarse Durhams, they greatly improve the quality, and for matched cattle they are unrivalled. The only drawback to them is the cows are second quality of milkers. A Hereford calf at six weeks old or an ox at six years, is the best selling meat in the market. Next we come to the despised Jersey. Only four years ago old Chancellor, one of the best Jersey bulls that ever stood in New England, stood in our shed all day, the only bull of his blood on the ground, without spot or wrinkle or any such thing in his look or pedigree, and remained "unhonored and unsung," not even "honorable mention" made of him, the Shorthorn committee saying they "didn't think it worth while to encourage the introduction of such looking creatures into the county." To-day, we had seven entries and six shown, fine animals of their kind, and it is gratifying to the lovers of good butter, to see how fast their progeny is working in among the persecuting Durhams, till now many of the Durham herds are using little Alderney heifers, instead of carrots, to color their butter. Devon bulls, only one entry, and he didn't come, for fear he would be swallowed up by the great cattle we suppose. We shall not mourn greatly at their absence, as we think they are no improvement on the Herefords for working, and not up to the Jerseys for milk; but when they do come they shall have a chance for their lives, a fair trial.

GRADE BULLS.

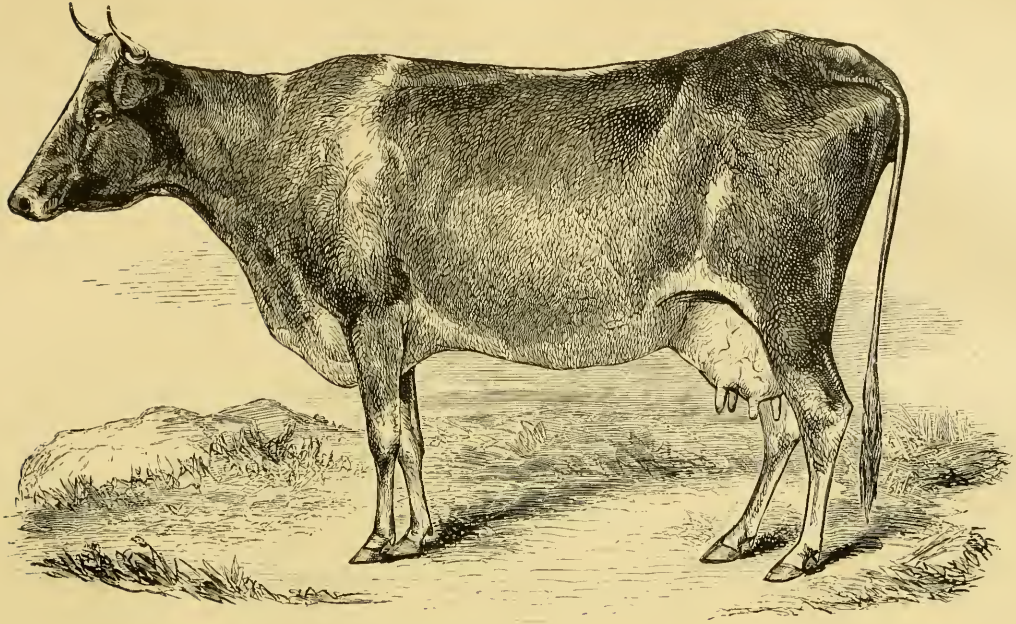
The only animals of this class exhibited that we recollect seeing, were grade Shorthorns, bulls of mammoth size, indeed in our view too large for comfort or profit. We think a bull of 1,500 to 1,800 pounds weight, is heavy enough, and is all these same animals would weigh if properly kept and worked. All bulls should be broken to the yoke and kept tame and under good subjection, by a reasonable amount of hard work. We speak whereof we know, as the writer of this has done his work on a large farm this season, with a pair of four-year-old bulls (Hereford and Jersey,) running in pasture and doing service as stock-getters at the same time. The Jersey bull's "descriptive list" for one year, is one hundred and three cows with only three failures. Then all the accidents that have come to our knowledge, such as mangling and death by goring, have been by unbroken, unworked bulls. But the main point of controversy, between the *bull men* in this county and society is, shall we use, or rather shall we offer premiums to grade bulls of any breed? This question is being rapidly settled in the negative by the great majority of agricultural societies in New England. The luxuriant pastures of Franklin County make splendid grade cattle, called by many even better than thoroughbreds. So some of our best farmers use high grade bulls and boast of it, believing that they are the best for them.

"As a man thinketh so he is;" let every many enjoy his own opinion. For the argument in favor of grade bulls, we refer the reader to the very able report of the chairman of committee on grade bulls of this year.

COWS.

Never since our organization have we had the pleasure of seeing such an array of fine cows, forty-two individual or single cows entered for premiums and shown, besides the three dairies of twelve good animals, making sixty-one in all, each worthy of a premium, and only seventy-nine dollars to be awarded to them all. The cow is really our step-mother, and no beast kept in the county is more profitable than the cow; with butter and cheese at the present prices, a good cow certainly pays; a poor one should not be tolerated at all. The crying sin of our dairy or cow men is the indiscriminate slaughter of the calves. But few comparatively are raised, thus diminishing yearly the number of good cows in the county, and probably is one cause of the exceeding high price of good milch cows among us. We think the raising of our best heifer calves an item of great importance, and should be encouraged by the society. Of thoroughbred cows there were shown six Shorthorns, four Herefords, Ayrshires two, Jerseys two, showing that our farmers are beginning to realize the value of blood. It costs no more to raise a cow worth two or three hundred dollars than one worth only fifty. We leave the matter of premiums, of particular items, to the committees upon the several classes of cows, only adding one remark in general: that is, there is no animal coming to our fairs so liable to injury by want of attendance as the milch cow; they need constant care and watching and cannot come a great distance without more or less damage. We ought to bear this in mind when we offer our premiums.

The great attraction of the show was the splendid exhibition of fine herds, nine in number, comprising 180 animals. Three of the herds, T. J. Field, of Northfield, J. S. Grinnell, of Greenfield, and J. Fogg, of Deerfield, were pure thoroughbreds. This department, we are pleased to observe, was better represented than at any previous show of our society. Four of the herds of grade animals, numbering more than a hundred, were from Shelburne; as many more, and probably the best herd in this



"LADY MILTON,"—Jersey,—owned by J. C. CONVERSE, of Arlington. See p. 155.

" little round world," remained quietly at home, feeding in their rich pastures—so that when we will we can show the *most and the best neat cattle* that can be produced at any county fair in New England. All we want is unanimity and harmony—a disposition on the part of every member to do all he can to promote the interests of the society, without regard to any slights of committees or abuses that may have existed in the past, but kindly suggest any improvement in the management of its affairs. See to it that the best men fill the committees, attend all the meetings of the society and write some sort of a report every time it is required, and we shall soon boast a society and a cattle show that will honor our farmers even beyond anything we have ever possessed or enjoyed.

In regard to cattle and steers, the show was fully equal to former years, though Shelburne failed to produce a town team as usual, and Deerfield was left *alone in her glory* with no competition. Of other neat stock, the yearlings and two years old were as good as ever—the heifers especially ; there were thirty-one entries of them, some most splendid creatures. We are not blacksliding in this most important feature of the show ; but it was not possible for us to observe in particular all these beautiful animals—the other appropriate committees must do them justice.

Respectfully submitted,

D. Orlando Fisk.
Joel S. Sanderson.

MILCH COWS.

MIDDLESEX.

From the Report of the Committee.

By the rules of the society, " the Committee, in making the awards of premiums, is directed to take into account the size of the animals, the richness of the milk, as well as the quantity given." Under this rule, the Jersey cows exhibited, had they been properly entered, would have taken all the premiums offered—the larger breeds standing no chance for a prize. The Jersey, as a breed, is of small size, and many of them are large milkers, and would be so considered for much larger cows.

The statements appended show the prize cows to be very large milkers of very rich milk, as shown by the quantity of butter made per week—from fifteen to eighteen pounds. There were others brought to the notice of your Committee which were worthy of premium; particularly the cow "Buttercup," owned by N. Foster, Jr., of Belmont; others of J. C. Converse, of Arlington, and H. M. Clarke, of Belmont, showing good points.

The Jerseys have long been esteemed for butter-making qualities. The Committee is of opinion that they will soon become favorites for milking qualities. They universally hold out longer than other breeds—seldom going dry more than thirty days—and giving more milk in the year. Without exception, they come in at two years old, and without detriment to their growth or milking qualities. They are as hardy and as easily kept as other breeds.

The Dutch cows entered by W. W. Chenery, of Belmont, fully maintained their high reputation, and were every one well worthy a premium.

There were but two entries of Shorthorns (the best breed for beef in the United States—maturing early, and with comparatively little offal,) both by J. A. Harwood, of Littleton, and both showing fine points and worthy of notice.

Of Ayrshires, the milk-farmer's favorite, but one entry was made, and that taking a prize. It is to be regretted that no more of this fine breed was on exhibition.

It is gratifying to see the interest and improvement in thoroughbred stock. It costs no more to keep a good cow than a poor one, and the profit is largely in favor of the good one, even at the present prices of blood stock.

The Committee deems it proper, in this report, to urge upon those who keep cows—whether few or many—the importance of the root crop for feeding; particularly the mangold-wurzel and the parsnip, from both of which large crops may be raised. The parsnip gives the richest and best-flavored milk and butter, and is very desirable to feed out in spring after standing in the ground through the winter. Corn fodder, particularly sweet corn, cut fine and steamed makes a savory mess much relished by cows, and increases the yield and quality of milk materially.

A much larger quantity of valuable fodder may be got from an acre of good land in roots than in any other way. Cows kept on such feed are always healthy, come in and do well in spring, and slinking calves is not common, and perhaps never known where such is generously fed out.

The Committee concludes by hoping that next year there may be a much larger number of entries, with full statements, *according to the rules of the society.*

For the Committee,
D. B. Flint, *Chairman.*

Statement of J. C. Converse.

Allow me to offer for your inspection and for the society's premium, the Jersey cow, "Lady Milton," No. 136. Her product during the first week in June was milk, 120 quarts, butter, 15 pounds; first week in July, milk, 144 quarts, butter, 18 pounds; first week in August, milk, 115 quarts, butter, 16 pounds; first week in September, milk, 107 quarts, butter, 15 pounds. She has been kept in pasture in June and July, and in August and September has received green fodder corn at night in addition.

Her aggregate yield in butter in July, on grass feed alone, was 79 pounds. From the 1st of June to October 7, on green feed without grain, was $293\frac{1}{2}$ pounds, or an average of $15\frac{92}{100}$ pounds per week for eighteen and three-sevenths weeks. The product of the above weeks is not an exception to the general product. The quality of her milk and butter may be seen by a sample on exhibition. I claim this to be an extraordinary yield, considering age and feed, entitling her to notice and a high premium. My custom in winter is to feed on good hay, steamed roots and corn fodder, mixed with a small quantity of shorts.

Arlington, October 1, 1867.

Statement of James S. Munroe.

I wish to offer for premium my Jersey cow "May-Day," twelve years old, out of David Dana's cow "Kate," by Thomas Motley's bull "Colonel," both imported. She calved in April. Her average yield of milk for June and July was twenty quarts of milk per day. Her yield of butter for July and August was fifteen pounds per week, made from sweet cream. She is free from any faults either as regards disposition or milking qualities.

She took the sweepstakes premium at Providence this year. Her feed has been grass, with one quart of meal and shorts each per day.

LEXINGTON, October 1, 1867.

WORCESTER WEST.

From the Report of the Committee.

It is of the utmost importance to have cows milked quick and clean, (that every dairyman knows,) for, unless they are, it will soon ruin the best cow we have. Many a poor fellow has lost his place in consequence of being a poor milker. The cow is one of the best gifts of God to man. She is indispensable to the support of the human family. She feeds millions with a large part of their food in various forms. Her products are carried wherever civilized man goes. She supplies many of the richest dainties for the epicure, as well as the principal living for the poor man with his large family of little dependents. Therefore she ought to have her place in the affections of man to correspond with the benefits she confers on the human family. The cow is no friend to the credit system; she pays her bills every night and morning. The better treatment and keeping she receives the larger return she makes. Therefore it is economy to give her the best of care both in summer and winter; not leave her out, as many do, exposed to the severe changes we have in the weather, half starved or kept on food hardly fit to bed a horse with through the winter; then, when she calves, complain because she does not give more milk, when in reality it is strange she gives any, considering her miserable keeping. Very many farmers have been in the habit of killing their calves for veal, it has brought such high prices for a few years past; therefore few calves have been raised; and when they were obliged to replenish their stock of cows, were obliged to buy such as they found for sale in market.

I believe it is much the best way for every farmer to raise his own cows. By so doing, with judicious management, he can always have a good milking stock. Raise from the very best cows in your lot, and keep them in a good, healthy, growing condition until they arrive at maturity. Many think a young calf can live on little or nothing, and give it food just sufficient to sustain life. The consequence is, they always have a miserable looking animal. I believe a calf will make a better cow for being kept in a growing and healthy condition when young. It gives her growth in all the elements together that constitute a good cow. I am not in favor of doing as some of our stock-raisers do, let a calf have the milk of one or two cows and all the meal it will eat until it is eight or ten months old, to see how large an animal they can get, almost worthless, except to relieve some fancy farmer of a few hundred dollars surplus funds. If farmers would make it a point to raise their own cows we should have a much better milking stock than we now have.

My mode of raising calves is this: I let them suck until they are four or five weeks old; then I teach them to drink, which I can do with very little trouble; I then add a small handful of pudding made from two parts of oat, one part corn, one part rye meal, boiled similar to pudding for family use, which prevents them from scouring, and they will eat it very readily. As to the best breed for a man to keep depends upon circumstances, whether for butter, cheese-making, or selling milk, and the keeping to be furnished for them. Large breeds of cattle require better feed than some of the smaller kind. In this vicinity the grade Durhams have generally been considered as good for dairying purposes as any. The Ayrshires are getting to be quite common, and are liked very much by those that have had them. Some farmers are introducing the Dutch breed, which are said to be famous milkers, but have not been used in this vicinity sufficiently to judge of their true merits. Good keeping and kind treatment are very necessary to get large returns from any breed of cows.

I will venture to suggest to the trustees of this society the propriety of offering a premium for the best herd of cows raised and owned by the exhibitor, for the purpose of encouraging the raising of their own stock, by requiring the herd to consist of a certain number, say not less than fifteen or twenty.

BENJ. F. HAMILTON, *Chairman.*

NORFOLK.

From the Report of the Committee.

The Committee are sorry to report that with four premiums at their disposal, of the value of over $50, the first being the

"Wilder Cup," there was but one entry made. Mr. J. W. Gay, of West Dedham, entered his fine herd of fifteen cows, as follows: One native, from New Hampshire; one grade Devon, from Vermont; one native, raised in Dedham; one Ayrshire grade, also raised in Dedham. The remaining eleven were all raised in Dedham, and are Jamestowns, varying from three to eight years old. Like most of the cows owned by regular milk farmers, these were part dry, and others nearly so, the herd giving from two to eighteen quarts each per day. According to Mr. Gay's statement, their feed has been rather short pasture with one peck of brewers' grains per day, and after-feed in its season. He feeds for profit rather than for fancy; is not a breeder and has no stock for sale; but he has drawn together such a herd of cows for use, as it would be very difficult to match.

As this herd was so largely made up of Jamestowns, and so few farmers know precisely what Jamestown means, when applied to stock, the Committee felt it a duty to gather what information they might in relation to the history of this breed, hoping the society would see the importance of making a record of the facts in its Transactions. This seemed the more important as it is understood that this society has acknowledged the Jamestown as a distinct breed.

In looking over the back volumes of the Norfolk Transactions we have found but one allusion to the Jamestown stock. Mr. Sanford Howard, in an essay on Cattle Breeding, published in the volume for 1859, says: "The Suffolk breed is without horns. It was formerly somewhat noted for dairy properties, but it is not extensively kept at the present time. It is not absolutely known that any of this breed have ever been imported into this part of the country; but polled or hornless cattle, which were formerly quite common here, bear more resemblance to the Suffolk than to any other breed. They certainly have no claim to the title of Galloway, which is sometimes applied to them, being different in color (the Galloways are almost invariably black,) shape and characteristics. Near the close of the last century Joseph Russell, Esq., of Boston, imported from England several hornless cattle, which the late Col. Jacques, who was well acquainted with them, believed to be of the Suffolk breed. They were kept in Chelsea, and some of the descendants of the herd are now in the possession of Benjamin Shurtleff, Esq., of North Chelsea. A cow was also brought to this country from Ireland, several years since, in the ship Jamestown, and hence was called the "Jamestown Cow," which closely resembled the Suffolk I have seen in England. A bull from this cow by a Jersey bull has been kept in Dedham several years, and has left a progeny which in general appears to possess superior dairy properties."

In preparing this report your Committee are under obligations to Dr. Wight and Col. Stone, of Dedham, for most of the history of the Jamestown stock.

In answer to inquiries, Col. Stone writes, Nov. 12, 1867, to the Committee on Herds, as follows:—

"SIR:—I have, at this moment, received from Dr. Eben Wight, the account of the stock of cattle known, in this vicinity, as the Jamestown. It is a cross between two thoroughbreeds—the Suffolk (no horned) on the part of the female, and the Jersey on the part of the male.

"In 1847, Capt. R. B. Forbes, as commander of the U. S. ship Jamestown, went to Ireland with a cargo of provisions for her starving inhabitants. On his return, the Lord Lieutenant of Ireland, wishing to confer some favor on the commander, made him a present of a fine Suffolk heifer, which proved to be one of the deepest milkers, giving in her flow, twenty-six quarts beer measure of the richest milk. She was a remarkably fine specimen of this superior stock, which stands high and prominent for the dairy in that country.

"Every one knows with what alacrity Capt. Forbes undertook this voyage of mercy, and on his return, he disposed of the cow, and gave the proceeds to the Irish Charity Fund. John Marland, of Andover, Mass., was the purchaser, and when he disposed of his farm she passed into the hands of John D. Bates, of Swampscott, Mass., and afterwards into the hands of Mr. Osborne, of Danvers, Mass.

"We are not aware that she ever had more than one heifer calf. This one was owned by Mr. Wallace Thaxter, of Boston, and proved a superior dairy cow. Several of her bull calves were raised in this vicinity; one that I have seen, by Benjamin Shurtleff, Esq., of Chelsea Mass. Nearly all her progeny are without horns, showing the remarkable strength of the *Suffolk strain.*

"In 1854, this remarkable cow dropped a bull calf, which was secured by Dr. Wight, and brought to this town, and raised by Thomas Smith and named Jamestown, after the noble ship that brought his mother to this country. He proved himself as remarkable in his progeny as that of his kind on his mother's side; his sire was 'Beverly,' a thoroughbred Jersey, out of 'Flora' by the 'First Prize Bull,' at the Royal Agricultural Show in Jersey. 'Flora,' the mother of 'Beverly,' was imported by Mr. Motley, and proved one of the most remarkable of that celebrated stock, having made sixteen pounds of butter a week."

Col. Stone says in conclusion :—

"I have but little to add to this account, which I think is entirely correct. You know the strong prejudice I have in favor of this stock, and you have seen some good specimens of the same. They possess qualities which I consider very valuable in a dairy stock. They are very gentle, I never having known a vicious animal, unless they were too strongly crossed with the Jersey. When 'Jamestown' was five years old, a four year old boy could manage him in safety; he was worked in harness and perfectly handy. They are perfectly hardy, good feeders, and hold out in their milk remarkably, which I consider *the great recommendation.* I know of several that *give milk the year round.*"

Your Committee are glad to learn that Col. Stone is endeavoring to preserve and perpetuate in its purity as far as possible this remarkable Jamestown stock.

Your Committee award to Jeremiah W. Gay, of West Dedham, for his superior herd of milch cows, the first premium of the "Wilder Cup."

For the Committee,

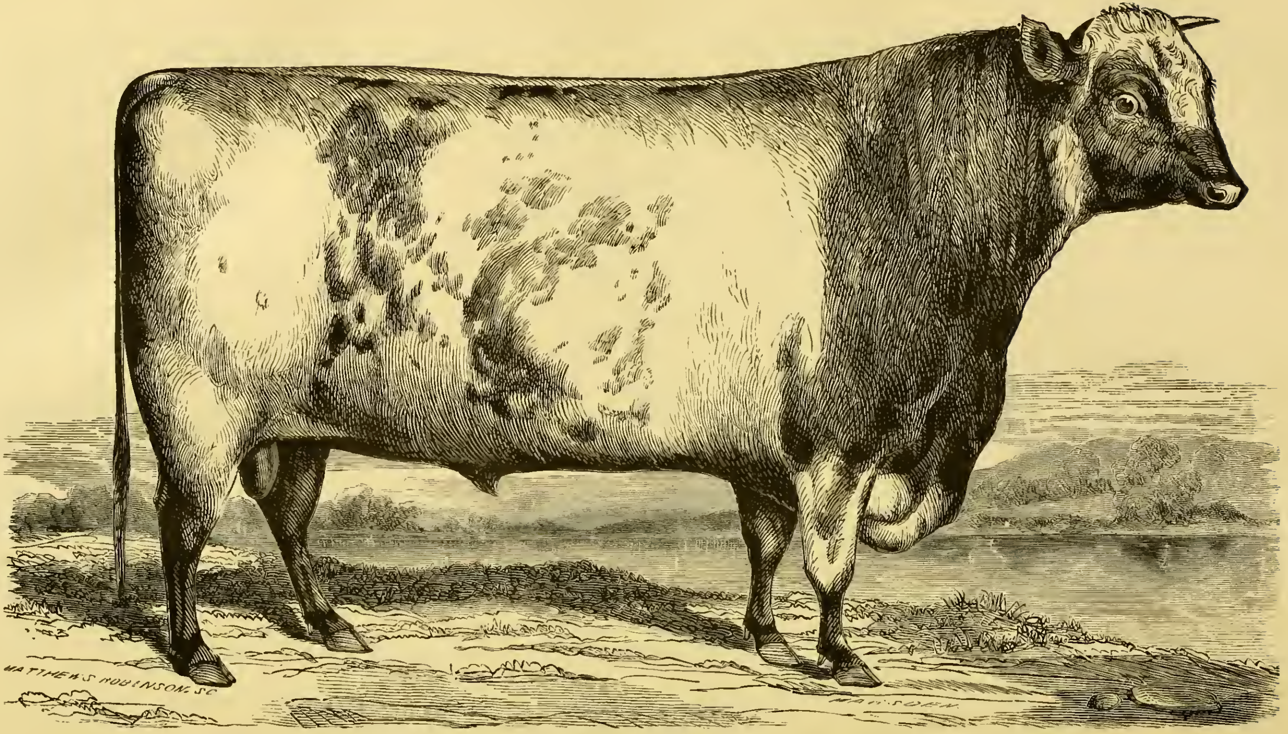
A. W. CHEEVER.

THOROUGHBRED BULLS.

WORCESTER WEST.

From the Report of the Committee.

The question with us farmers is, Shall we breed from "thoroughbreds," or shall we breed from what is most convenient for the time being? When we inquire what cause has produced such excellence in certain breeds of horses, cattle and sheep, we are led to acknowledge the superiority of the former course. From what has sprung the best horses of New England but


MATTHEWS ROBINSON SC
MARSDEN

"WINDSOR,"—Shorthorn,—owned by A. J. CASS, of Holliston. See Preface to Abstract of Returns.

from Messenger, Justin Morgan and Black Hawk? And we all know what results have followed by pursuing the course adopted by the originators of the Shorthorn cattle. So also with the Ayrshires: sprung from an ordinary race, by scrupulous care in breeding, the breed has, in the minds of some, attained the highest type of dairy animals. So with the Jerseys: in their native island home, the law forbidding the importation of cattle has preserved the race in its purity, and the highest point in one direction is here obtained—the richness of milk.

These are facts which everybody knows about, and yet why are we so slow to profit by their teachings? Now the classes of animals to which we have alluded can be as profitably bred here as elsewhere, if the New England farmers will but apply themselves to the business of breeding, as the English and Scotch farmers apply themselves to breeding the very best animals possible.

There is no doubt that this whole business of breeding is one which requires the utmost care, the keenest discernment and closest observation; yet all that is wanting is to set about it with determination—yes, with enthusiasm—and then we shall make rapid advancement. Our herds, instead of presenting here and there a few first-class animals, will all be made up of a corresponding high type of excellence.

The English agricultural societies offer premiums for nothing but thoroughbred animals of some specific breed; and many of the New England societies are doing the same, believing there is no real progress in any other direction. Be that as it may, can we not improve upon what we have within our reach—in our hands? A man must be "master of his own situation;" must determine in his own mind what breed is best for his locality, and apply himself to the selection of animals for breeding purposes; and then to reproducing and increasing them on his farm. How to do this successfully—how to obtain the best dairy cow—is a question of the first importance. A few suggestions which occur to us may not be out of place here. We are mainly dependent upon the male for the improvement of our stock.

We believe that there is a great error committed by the too early and too great use put upon bulls for them to get strong and healthy calves, full of vitality, as they would otherwise.

Is not the larger part of our stock got by (calves,) yearlings before they are eighteen months old? It is to be regretted that when the male *begins* to exhibit his full masculine development in perfection, and arrives at an age when he might be reasonably expected to impart vigor and stamina to his progeny, he is set aside because he is a troublesome fellow.

In the selection of a bull from which to breed, mere external form, however necessary, is by no means the only requisite; if we wish him to impart special qualities to his progeny—for instance, milking qualities—we must look to his ancestral record; neither is it sufficient to know only immediate parentage; you must, before you are sure of the right kind of an animal, know his ancestry for at least three or four generations, else you will have the poor qualities of immediate preceding ancestry cropping out where you do not want it. This is a point of great importance, for if we can trace a long line of good milkers, without any intervening poor crosses, we may be very sure of success.

One great source of mischief we apprehend, arises from allowing our heifers with their first calf to become pregnant by an indifferent bull; facts go to prove that the impressions made on a heifer, got with calf by an inferior sire, may exhibit themselves in after productions, although a different male is used.

The greatest progress in the improvement of our dairy cows in this vicinity was made by the introduction, in 1841–2, of the thoroughbred Durham bulls "Monarch" and "Hawthorn," by Mr. Ayres, and in 1845, the "Duke," through Mr. Twichell. The impress which they left is still to be seen in our best herds. But much of what was then gained we fear has been lost by indiscriminate crossing and recrossing.

What is true in relation to these animals and this breed may prove true in relation to the recent introduction among us of the thoroughbred Ayrshire and Holstein breeds. We would say, preserve your fine specimens from "entangling alliances;" do not couple your choice grade heifers with mongrel natives, or Devons, or Durhams; keep your breed "in the line," for it must be constantly kept in view that we must always breed towards the stronger or better blood, or otherwise we are constantly deteriorating; breeding your best cows with thoroughbred bulls, coupling their progeny with an animal of the same breed, distantly connected, reject second and third rate animals for breeding purposes; persevere until you have *thoroughly inbred* every good quality and *bred out* every undesirable trait and point.

This is a work of time; but the price—of reward—in the pleasure and profit it will afford, will more than amply repay the husbandman. We know of no reason why the farmers of Worcester West may not more than rival Bakewell, the Collings Brothers, and Bates, of English fame in breeding, and our own prince of breeders this side the water, Thorn of Thorndale.

A want of space would seem to forbid a more elaborate discussion of the principles here suggested; but if, by these few thoughts, we can awaken a greater interest in this most important department of agriculture, or by these means draw from others that which shall enable us to avoid the failures of the past, and in the future arrive at a higher standard of excellence, our object will be accomplished.

T. P. Root, *Chairman.*

FAT CATTLE.

WORCESTER WEST.

From the Report of the Committee.

The majority of the fat oxen entered for premiums at this fair were, in fact, working oxen; cattle, as some of their owners told us that day, that had done all the work on their farms the past season, and yet they were good beef. This may seem strange to some. I have had men ask me how it can be done. I reply, select smart, thrifty, well-made cattle, with good disposition, active, matched for strength, with thin, soft skin, with considerable Shorthorn blood. Such cattle, well cared for and well fed, will do all any farmer ought to do and grow fleshy.

There is a great change for the better in the general management of working cattle within fifteen years; then I remember seeing a teamster driving a pair of oxen, and the snapper to his whip was a tenpenny nail; now we see, at the late fair, cattle do all in their power, and the driver had nothing but a cotton string on his whip-handle. Perhaps these are extreme cases, but it is well known that cattle are now treated with much more kindness than years ago. People differ very much in their manner of getting profit on their cattle. In the year 1866 I knew a man who did all the work on a large farm with a pair of cattle, and realized over $200 gain on the same. I also knew another man who said his cattle and himself worked out, aside from his own farm work, to the amount of something more than $200. Here is quite a difference in the manner of gaining the $200.

This is an uncommon case, but farmers do not generally get the gain on their cattle that they ought to. The time has come when all farmers can raise or buy the best kind of cattle, and a good pair can be raised as cheap as a coarse, sharp-backed, thin-thighed pair, which the farmer will sell for from fifty to one hundred dollars more than the latter for beef or for work. This fact ought to be enough to put every farmer, who has not duly considered the matter, on the right track.

To have cattle do well, they should be fed regularly and liberally. Everything they have to eat, and the place where they eat, should be kept neat and clean, for they are truly *neat* cattle.

My experience in making beef successfully is that it depends more on feeding such kind of food as best suits their appetite and health, than a great quantity of meal. My best experiment in fattening cattle was in the winter of 1866. I fed twice per day; first with early cut hay, as much as wanted; then, after being watered, fed them one peck of some kind of roots with two quarts meal. The same at night, and fed in the same way. That is, hay, half bushel roots, four quarts Indian meal to each ox per day, and they gained to my satisfaction. The pair weighed, when dressed, 3,228 pounds. This is the best gain I ever made on one pair. I have sold my working oxen fourteen years out of sixteen for either extra or fine quality of beef.

This is no more than every farmer can and ought to do. Beef made with some roots added with the meal, and careful tending, so as to gain fast, is much the best beef. It causes the fat and lean to be nicely mixed or marbled, (as the butchers say,) and will eat rich and juicy; while the animal which is fed longer and with a larger quantity of meal will have more tallow and more outside fat, and will not eat as sweet and juicy.

J. T. ELLSWORTH, *Chairman.*

HORSES.

NANTUCKET.

From the Report of the Committee.

There are many members of this society who can look back and see the race of small-sized and awkward nags that were once bred in this county. The owners had the same ideas that some people have with reference to raising children. They thought exposure to the rigors of winter would toughen them. A horse turned out on the commons in winter, without shelter, and dependent on the precarious supply of herbage that the winter offers, will of necessity be stunted in size and weakened in spirit. Some may live in spite of the exposure, as some children live in spite of *their* exposure; but the crows take a large proportion of the one, and the graveyard of the other, long before the "time allotted" for their stay.

We do not mean to convey the idea that the more nursing and the more pampering horses have while young, the abler they will be for service. The "happy medium" is what is required. They should be exposed reasonably, in good weather, regardless of cold, and fed sparingly on stimulating grains. They should be handled continually while young, and petted upon the farm. Horses need to be *taught*, "not broken." They are animals of considerable intelligence, and of a kind, affectionate and docile spirit. If they only knew what you wanted them to do, they would do it most cheerfully. Kindness and firmness and continual handling will train them to whatever is within their capacity; and, almost without exception, under such treatment, when harnessed for the first time, they will go off as well and as steadily as older animals. The way colts were used long within the "memory of man" was cruel beyond measure. In fact, their whole life, from the cradle to the crow, in many instances, was one continual walloping. The mare was turned out into the pasture in early spring to foal. When the colt was born, and baptized with two or three days' sleet, and well fanned by a chilly north-easter, both mother and offspring were driven up into the barnyard to shiver under the lee of a dilapidated shanty by day, and to lie at night in the cold muck of a weather-beaten barn, just as impervious to the weather as a five-rail fence, and not more so. When a few months old, he was kicked out of the back gate to be seen no more, except accidentally, for two or three years. The wild pastures of summer gave him some comfort and some fat, but the winter reduced him to a skeleton. The second year he was a little bigger in size, but no mortal man could tell a two-year-old from a yearling by appearance. When the spring of his affliction had come, when he was to be "broken," as it was called, some old fellow was sent out to Mattaket or Koskata (local places east and west of the town,) to look him up and drive him to the owner. After being duly emasculated, and the wounded arteries and cords tied up with a ropeyarn, he was left for awhile to get well as he could. A very little hay was given him, which luckily kept down the inflammation, and in a month or so, he was put into the hands of the professional breaker to be "broken." This important instructor was usually a blear-eyed savage, measuring about four feet across the shoulders. He came with his great shaggy whiskers and fist like a top-maul, the blood apparently bursting through his red and varnished face, and his nose blazing like the lightship on Brandywine Shoals. Armed with his loaded whip and diabolical bitting bridle, and occasionally a cart-stick to knock his pupil down when circumstances required, the poor pot-bellied victim was put into his hands. Then he was whipped to make him go, when he did not know how to; and whipped to make him stop, when he did not know he must. He was knocked down when he reared, and knocked down when he "balked." The wales on his body gave him the appearance of a zebra, while the scars and chafes on his back and shoulders made him more spotted than a leopard. After all the spirit and brains and blood were beaten out of him, he was delivered into the hands of his owner, a poor, timid, ignorant, weak, stubborn and good-for-nothing beast. The proprietor took him at once to the blacksmith to be cruelized a little more. He did not know how to eat hay very well, and was totally ignorant of corn; and, under the advice of some ignorant neighbors, backed up by a horse-jockey or two, the whole roof of his mouth was burnt and mangled with a hot iron to cure him of the "lampers," and "restore his appetite;" the ignoramuses not knowing that there was no such disease as the "lampers," as they are called, except what exists in the brains of stupid grooms and conceited stable boys. If they looked into the mouth of every young horse, they would find the same ridges and in the same state; that they were perfectly natural; that they had no connection with the horse's feeding; and that nothing but stupidity ever thought they had. We hope our farmers will remember that the burning of "lampers" (or cutting them either,) and the burning of witches, belong in the same category, and that scientific farriers have long ago put them there.

The intelligent and inquiring farmer might fairly expect in a report of this kind to have some suggestions on the best breed of horses, as they have had heretofore on the best breed of cows or sheep. To go into this would require more time and more information than the Committee have. While a pure breed of cows or sheep is best for the farmer, a mixed breed in the horse is requisite. Our farmers require one horse to do everything. In England they can have a breed of hunters, and they do nothing but hunt. They can have a breed of race horses, and they do nothing but race. They have dray horses as a breed and coach horses as a breed, which we cannot have. We require one horse that will do everything. He must be a good traveller and a good dray horse. He must not let his neighbor's horse beat him while going to town, and he must draw the plough as well as he. He must be docile and not upset the family, and patient when placed before the oxen.

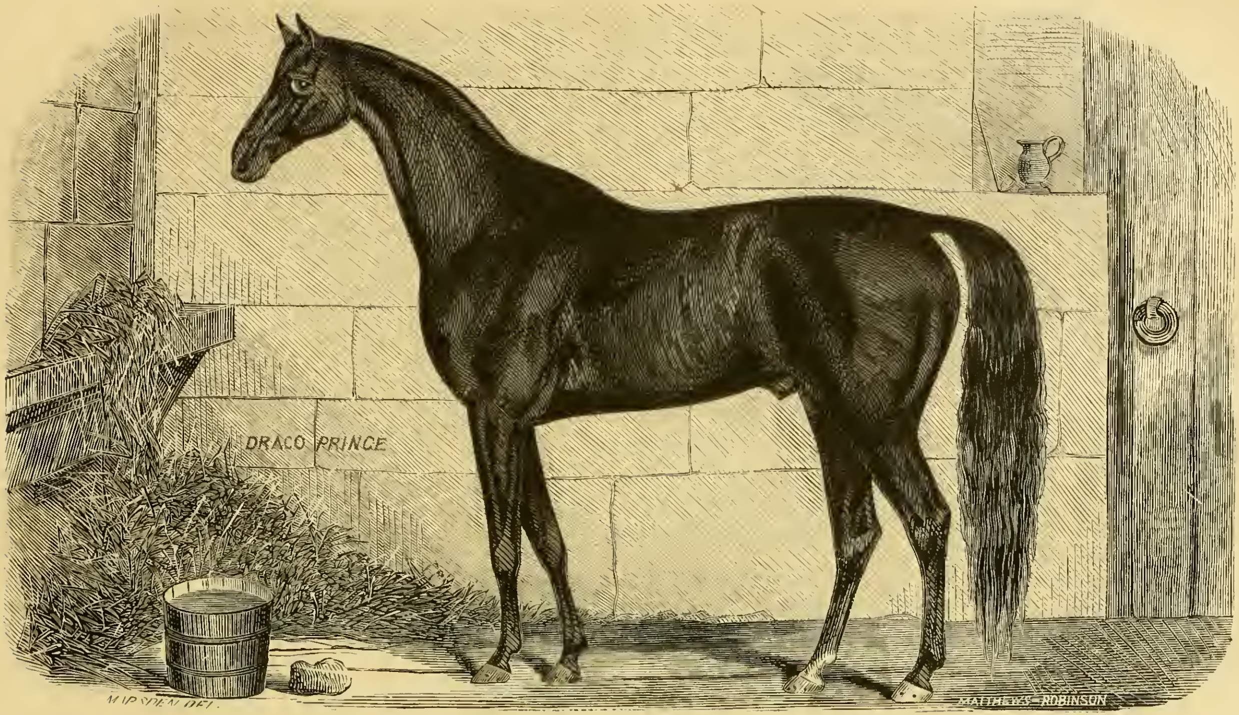
We have only one "thoroughbred" in the county—the mare "Fanny," owned by Joseph C. Palmer, Esq. The rest of the horses here are of mixed breeds, and much more desirable for farm horses. We will trespass on your time enough to describe very succinctly the common horse as seen about New England.

A "thoroughbred" horse is one that comes from the hot blood of the Arabian desert. There are the Arabian, the Barb and the Turk—names from the location of their birthplace. Some of these were carried to England, and from England brought to America. There are very few in this part of the country. They are beautiful horses, and extremely valuable. Their endurance is very much superior to that of our breeds of horses.

There were some pure and many half-breeds in the Southern cavalry during the war, and that fact accounted for the rapidity with which the Southern cavalry changed their points of attack.

We have only space to name two horses and say a word in regard to them. We name these two because they have marked the horses of New England infinitely more than all the rest. We speak of the " Morgan " horse and the " Messenger " horse. There are very few good horses in the Northern States that do not have in their veins the blood of one or the other of these celebrated horses, or of both.

The first Morgan horse was called " Justin Morgan," from his owner of that name. He was born in Springfield, Mass., in 1793. In 1795 he went with his owner to Randolph, Vt. His sire was a " thoroughbred " stolen from Gen. DeLancy at King's Bridge. The mother was a part " thoroughbred " and part Canadian. From the Canadian mother the " Morgans " get probably their hairy legs and heavy mane and tail. A description of this " Justin Morgan " may be acceptable. Flint says he was a small horse, a trifle less than fourteen hands high, and his weight nine hundred and fifty. He was a beautiful dark bay, with hardly a white hair on his body. His legs were black, his mane and tail were black, coarse and thick, with long, straight hair, free from curls. He had a good head, not large, but lean and long, with a straight face, broad and good forehead, and fine small ears set well apart. He had a very short back with wide and muscular loins, rather a long body but round and closely ribbed up. He was compact or snug built, with a deep, wide chest and projecting breastbone, short, close-jointed legs, wide and thin, but very muscular, with some long hair about and above the fetlocks. This peculiarity is to be noticed in most of his offspring. He was a fast walker, but a short step in trotting, a low, smooth gait, but square and fine ; what on the whole is called " pony-gaited." He was sure-footed, and his style of movement lofty, bold and energetic, full of life and spirit, but of so mild a temper that any lady could drive him with perfect safety. This is really the description of a good horse to-day, and if any one in selecting a horse observes these points, he will be much aided when he desires to purchase.


DRACO PRINCE
MARSDEN DEL.
MATTHEWS-ROBINSON

"DRACO PRINCE,"—7 years old,—owned by JOHN R. POOR, of Somerville. See Preface to Abstract

This horse was the father of many colts. But three of them were famous, and each became the progenitors of a long line of horses very marked and very famous in New England.

"Bulrush Morgan" was born in 1813. He had more muscular development than his brothers. His mother was a dark bay mare, bought in 1812 out of a six-horse team that carried merchandise between Montpelier and Boston. She weighed a thousand pounds, and was a hardy, rugged and enduring animal. Of the Bulrush Morgans, the "Morrills" have gained great popularity. His stock, which was widely distributed through Vermont and Maine, he marked strongly with his own powers of endurance.

"Sherman Morgan" was foaled in 1808. He was a bright chestnut. He was a beautiful animal, having most of the good points of his father, and was the father of many colts that were raised in New Hampshire and about Boston. He died at Lancaster, Mass., in 1835. His descendants were remarkably fine horses of all work, and were the best stage horses between Boston and the East.

The third colt of "Justin" was the "Woodbury Morgan." This horse was fifteen hands high, of a dark chestnut color, and a white stripe in his face. His style of action was superior to his brothers; it was bold and resolute, and he was very much sought after as a parade horse.

One other horse we must mention, because we shall connect the two families with Nantucket before closing; that is "Black Hawk." No horse is more prized as a trotter in New England than a "Black Hawk." The old Black Hawk was foaled in Greenland, N. H., in 1833. His skeleton is now in the office of the State Board of Agriculture, at the State House in Boston. He died in 1856. He was a remarkable horse, beautiful in appearance, and whether in harness or out, attracted universal admiration. He could trot his mile in two minutes forty seconds without training, was of great intelligence and great endurance. He possessed the power of transmitting his speed and other characteristics to his offspring in a degree unsurpassed by any horse in the country.

We said that the "Morgans" and "Messengers" were the leading horses. "Messenger" was a thoroughbred. He was imported into Massachusetts, in 1791. He was a beautiful gray horse. He was the son of "Membrino," one of the most superb running horses ever on the English turf. It is enough for us to name among his immediate descendants, "Hambletonian," "Abdallah" and "Engineer." The renowned "Lady Suffolk" was his great-grand-daughter. The Hambletonians are a cross between the Morgans and Messengers, having the beauties of both.

We have been thus explicit because we are bound, as part of our duty, to notice the stallion entered by the president, James Thompson, Esq., for a premium, and to which we cheerfully awarded the first one of fifty dollars.

This excellent animal was foaled July 6th, 1863. He is of a beautiful bay and dappled in the summer; heavy black mane and tail; weighs eleven hundred and sixty pounds, and is sixteen hands high. He is short back, close built, well ribbed up, and a coat fine and silky. His two hind feet are white nearly to the fetlock; he is admirably well broken or trained, and bids fair to be a remarkable traveller. His sire is Taylor's Berkshire "Black Hawk;" his grandsire "old Black Hawk;" his great-grandsire "Sherman Morgan," the son of the famous "Justin Morgan."

On the maternal side, his mother was "Lady Swan," a fine Hambletonian mare. So you perceive he has the "Morgan" and the "Black Hawk" from his sire, and the "Messenger" from the Hambletonian mother. And he shows the best points of both stocks. He has shown himself to be one of the best stock getters ever in this county; his colts are very vigorous and healthy, strongly marked by the sire, and, as far as they have been shown at the fairs, have taken the highest premiums. His capacity for travel, the power he has of transmitting his excellent marks so strongly to his progeny, and his high pedigree, give to him so great a money value, that we fear our small community cannot offer sufficient inducement for the owner to keep him in this county. We hope the society will, if possible, retain him, by making compensation from its own funds sufficient to satisfy the proprietor. In closing, we say to the farmers of Nantucket, that they should look very much to the qualities of a stock horse when they intend to raise a colt for market. Speed is what now sells in the market at most fabulous prices. Bonner of New York, has just paid fifty thousand dollars for "Dexter." If you want fast colts you must have the sires at least, from fast stock. It would be better if you could have both mare and horse too from stock remarkable for speed. After the colt is born, then take care of him; keep him in comfortable quarters; feed him on fine food; keep up his growth and courage with care and delicate feeding; handle him often and make a pet of him; train him early to trotting, only be careful not to strain him, and if he does not make a remarkable trotter, he will make a fine horse. The Arabs stand at this day, at the head of the horse breeders. Let us give heed to those who are masters of the art. With them we find more stress laid on the quality of the mare than the horse. A first-rate mare cannot be bought from an Arab. As the farmers of our county have to use such mares for breeding as they happen to have, they can only rely for improvement now on the qualities of the sire, when they propose to raise a colt. But let them seek carefully for the very best pointed mare they can find, and with a good-blooded stock-horse, they will very much improve the progeny.

For the Committee,

E. M. Gardner.

SHEEP.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

From the Report of the Committee.

Sheep-raising should attract the attention of every farmer, as sheep will subsist on herbage that is rejected by other stock; sorrel by them is esteemed equal to clover. On dry, gravelly soils, producing mostly sorrel and weeds, where other animals would starve, sheep thrive, and become the favorites of epicures. As most farms have pasturage suited to their wants, the raising of a few sheep at least is worthy of consideration; large flocks may not be desirable in this locality, (the great West being the appropriate field, especially for growing wool,) a suitable number proportioned to the capacity and circumstances of the farm have and ever will give a good result. Who has not noticed the remarkably fleshy condition of a few cossets, kept with a herd of cattle, living mostly upon what would otherwise be a total loss? In what other way can meat be raised so cheap per pound, after deducting the value of the wool, and what meat commands a higher price than that of a fat lamb? Taking into consideration that the villagers are around about us in all directions, who can hesitate to avail themselves of the opportunity to increase their income by furnishing the delicate ladies with as delicious food as Palestine ever produced?

Raising sheep for the purpose of speculation has become so common that its evil influence should be noticed. Its tendency is to cause persons who have flocks of good sheep to become dissatisfied with them, because some other person has sold a different breed at a much higher price than they can obtain for theirs, whereas very likely they were of less intrinsic value.

Vermont is notorious for high-priced sheep. The consequence is, the breeds considered less valuable are being sent to cities and villages to be slaughtered and sold for what they will bring, thus depressing the sheep-raising business in the lower valley of the Connecticut for the time being. This state of things will not last, as the Irishman remarked, in relation to the swamp lands, that the Americans have yet to learn that their poorest lands are their best. Possibly it may be found that the flocks now considered of less value are actually the most valuable. Manufacturers have learned that Vermont twenty pound fleeces contain only four to six pounds of wool, and farmers will soon learn that it is more profitable to raise sheep that will deposit their fat inside than on the outside of their skin. The sheep that produces a large amount of yolk on the surface cannot be expected to produce a large amount of milk. The yolk-producing sheep must therefore soon yield to a better breed. This Vermont sheep speculation reminds one of a fool and a knave at a mock auction, the former bidding upon the supposed judgment of the latter until the fool and his money parted. Merino sheep are not worthless—far from it; they are valuable if crossed judiciously with other breeds; they have splendid constitutions—an essential quality. Southdowns, for practical purposes, are very much improved by being hybridized with Merinos, giving a better constitution to stand our severe winters. A friend, who has kept the different kinds of coarse and fine woolled sheep, having purchased a flock of hybrids, (from Southdowns and Merinos,) is positive that they were the most profitable that he ever owned. Our experience is that no coarse-woolled sheep can stand two years in a flock of three hundred Merinos without becoming diseased. The Southdowns, being of a cylindrical form, appear to the eye in better flesh than the fact warrants ; it requires but the touch of an expert to detect the error.

The exhibition of sheep was very limited. It was difficult to dispose of the premiums from the want of numbers. This state of things will probably induce a good and full representation another year. As the premiums are the magnet, we will suggest a revision and extension, if found practicable. Very few persons can compete for the premium offered for fifty ewes. Would it not be well to reduce that number to twenty-five, and divide the premiums, thus increasing competition ? If premiums on single sheep were so arranged that twice as many were offered, it might induce twice the competition. The sheep exhibited this year were mostly in good flesh, and very fair specimens of their kind. The flock of fifty ewes exhibited by J. A. Morton, of Hadley, gave evidence that their owner had not ceased to be a good shepherd, and continues to look well to his flock. The Southdowns exhibited by Messrs. M. J. Smith & Son, of Northampton, were of unexceptional form, the anatomy being perfect with the exception of a slightly too great length of legs for the size of the body. The sheep exhibited by Parsons West, of Hadley, are a mongrel breed, gathered perhaps from the four winds of heaven, forming a most happy and valuable combination, giving evidence of possessing a splendid constitution, good fattening qualities and fine size.

We will venture to suggest to the society the importance of assigning some point or place as a rendezvous for the committees to meet and organize for their work. It will be a very great convenience to those acting on committees.

CHARLES EASTMAN, *Chairman.*

SWINE.

MIDDLESEX SOUTH.

From the Report of the Committee.

That the fattening of swine is a matter of vital interest to dairy farming, every thoughtful farmer feels; and that it presents some difficult and uncertain problems, both his experience and his balance-sheet testify. Whether on the whole, the rearing and fattening of his swine results in a direct profit or a loss; and whether the permanent advantage to his lands is more than offset by his trouble and the low price he seems to realize for his grain, are points he greatly desires to have cleared up.

Some facts and considerations, to aid the farmer in determining these questions are herewith submitted.

That, to keep up his farm and make it pay, his milk (the cream excepted,) and grain or their equivalent as well as his hay and vegetables, *must be put back on the land*, no observing farmer doubts. And he soon ascertains that *the equivalent* is not easy to find. He can easily find *substitutes*, but they are not equivalents. He may spend his capital to buy specifics; he may sell his milk and buy grain; with the aid of concentrated stimulants he may raise roots, &c.; but it is not precisely the thing; he fails to put back into the soil what he takes from it, *in the shape in which the plant growth demands it*. As a shrewd man once said, "Corn is the best judge of manure." Plants have their demands in the elements of food, and also in the peculiar condition and combination of these elements. They relish what is according to their taste, and it gives a vigorous, healthy growth.

Feeding his milk and a generous portion of his grain to swine, to be transformed into their kind of manure, is his readiest means—and in the long run it will probably prove his cheapest means—of getting precisely what his crops need: of supplying the exhaustion which results from feeding milch cows. Hog manure has the property of acting quickly from the large per cent. of nitrogen it contains; it is rich in phosphates; and it is nearly as lasting in its effects as the manure of cows. Its value, as compared with that of cows, may be seen in the following table:—

CONSTITUENTS.	Excrements of Cows.	Excrements of Hogs.
Solid dry substances,	160	200
Nitrogen,	3	6
Minerals, as potash, lime, &c.,	24	30

Where the piggery is supplied with loam, peat, or road scrapings, and mixed as growing hogs are apt to mix the mass, the more volatile parts of these excrements are all utilized, and a large amount is cheaply obtained. A thrifty hog, if you will furnish him the materials, will make one cord of first quality manure in a season. And it will not interfere with his health and condition. He enjoys the exercise, and digests his food all the better. The farmer may go to chemistry, or to Coe, or to the Chincha Islands, to find a supply for the waste of his crops; but he will find nothing to take the place of the pig-sty.

In estimating the profits of fattening swine perhaps the most important preliminary inquiry is, Shall the farmer fatten and kill his pigs at from eight or ten months old; or shall he keep over and send to market at from fifteen and eighteen months?

Undoubtedly so far as money profit is concerned, he will realize the greatest net gain at from eight to ten months. With the smaller breeds and thrifty pigs, he can get a weight of from 250 to 300 pounds, while as commonly managed, the additional eight months only add about 100 pounds. Indeed, experiments show that it costs but a trifle more to grow and fatten a weaned spring pig to ten months old, than to fatten a ten months' store hog from July to December. Under favorable circumstances, it may cost less; and the net profit be in favor of the pigs.

One of our most careful feeders (Joseph Jennison of Southborough,) put three shotes, Suffolk and Mackay, to fattening, July 1. Their weight then was 200 pounds each. He fed them fifty-three bushels of mixed grain, two-thirds corn and one-third oatmeal, which cost $47.15. Their dressed weight after five months' feeding, was 395, 380, 343. A bushel of meal made nine and three-fourths pounds of pork. His pork cost him nine cents per pound.

One of your Committee bought three six weeks old pigs, Mackay and Chester County, in early spring. Their weight was thirty pounds each. He fed them forty-six bushels of grain, two-thirds corn and one-third oatmeal, which cost $43.78. Their dressed weight, at eight and one-half months old, was 321, 295, 271. A bushel of meal made sixteen pounds of pork. His pork cost him five and one-half cents per pound.

In the first case the corn cost $1, the oats fifty-five cents per bushel; in the second, the corn cost $1.08, the oats seventy cents per bushel. This makes the advantage still more decided on the side of the pigs.

Unless we have a warm piggery, the waste of winter feeding is a large item—in too many cases a dead loss. A shivering pig kept on slops through the winter, must necessarily open the spring with an impaired constitution; and with a poorly developed frame for laying on fat. And it may as well be said in this connection, that the success of any system of feeding and fattening will depend essentially on warm, dry, sunny quarters.

But with the dairy farmer, the manure profit is equally important as the money profit. In order to realize the most from his skimmed milk, of which he has the greatest abundance in spring and early summer, he must have stock pigs, of from six to eight months old: otherwise he defeats his main purpose. His only alternative is, to keep the requisite number of breeding sows, and depend on the extra number of small pigs to consume his milk; and take the risk of finding a market for such surplus as he does not wish to keep over. With warm snug quarters, store pigs may be carried through the cold weather at a reasonable cost; and by providing plenty of sods in the fall, or throwing in horse manure, &c., he will find a big pile of rich compost ready for his spring planting. What he feeds them in the cold weather will thus return to him in season to finish their fattening in November. And the more corn fed, the more corn returned at harvest. The means expended furnish the means of increasing the productiveness, and of course, the real value of the farm. It is money at compound interest.

The difficult part of the problem is to carry his shotes through the winter months at such an expense as to make the first two hundred pounds cost about two-thirds as much as the last two hundred pounds, or whatever the addition is, thus reducing the actual cost of the dressed pork to a paying rate. To accomplish this, the first essential, as already stated, is warm, dry, sunny quarters, so that all the food given goes to growth and fattening.

The second essential is perfect regularity in the times of feeding, so that the pigs shall not fret and squeal away their flesh.

The third essential is to give enough of nutritious food to satisfy the natural appetite. Any attempt to save by short commons or "extended" rations will make both pork and purse without breadth and thickness. These three items, which are matters of care and judgment rather than cash, will make a difference of at least one cent per pound in the cost of his pork.

In selecting the kinds of feed, he will remember that growth is a primary object, and take such as naturally produce bones and muscle, and such as are adapted to generate animal heat. And the mess should be fed warm for the same reason. On the farm there is more or less milk, even in the winter, and this of course goes into the swill-tub. Next to this, as a chief reliance, both in goodness and cheapness, comes sugar beets. These are highly relished by swine, in both a raw and cooked state, though for winter feeding they should be cooked. The sugar of beets goes to keep up the temperature and vigor of the system, as well as afford nourishment. Sweet apples are of the same general nature. But these alone will not satisfy the hunger and insure growth. The animal must have gluten and lime and oil as well as sugar. And these are most plentiful in the grains. What kind of grain should be most relied on, will depend on the ruling prices for the time being. Wheat bran, oat and barley meal more directly produce bone and muscle, and scraps and corn meal supply the oil for producing fat. Variety is relished by growing pigs, and a mixture of grains seems necessary to keep up a healthy condition. The mess should be salted twice a week. With corn at one dollar per bushel, and oats at sixty-five cents, it is safe to depend mainly on them and the beets, as these two grains contain in large per cent. both growing and fattening properties. His pork thus made, the first two hundred pounds will cost him under six cents per pound.

Whatever method is adopted, he must feed so as to keep them growing and fattening all the time. *A daily gain* should be the fixed rule. Too commonly, if any stock is neglected, it is the young, growing animals; and the fattening stock is pushed. Push them all as fast as health will permit. An animal fed high from first to last will consume less in total amount than if stinted in his pighood.

And in no one point, perhaps, is the value of the improved breeds of swine seen more distinctly than in the economy of feeding for growth. The small bone, the compact form, the quiet disposition, the tendency to take on fat, are all material items in the cost of raising. Which breed is best, your Committee are not called upon to decide.

Another practical question is, Is cooked or uncooked food best for fattening swine ? Science, both chemical and physiological, settles this question in favor of cooked food. Some years since the details of an experiment made by a careful and reliable farmer, and published in the State Agricultural Report, seemed to settle the question in favor of raw food. " The meal used was composed of one-half corn, one-fourth oats, one-fourth broom-seed. In cooking, the meal was boiled thirty minutes. The pigs selected were all doing well upon uncooked food. I put four in two pens, side by side, and weighed them four different times. I fed two of them with cooked meal four weeks, and they weighed less by eleven pounds than when I commenced. They ate four bushels of meal. I fed eight and one-fourth bushels of meal, uncooked, to the others, and they gained eighty-two pounds. I then fed the last named pigs three and one-half bushels of cooked meal, and in three weeks they lost four pounds. I fed five and one-half bushels of raw meal to those first fed on cooked food, and in three weeks they gained sixty-one pounds. I think this proves conclusively that we cannot fatten swine with profit on cooked food."

Before accepting this as conclusive in favor of raw food, it should be considered that it lacks the essential elements of a fair trial. First, because *any sudden change of diet* with fattening hogs is injurious. The stomach and absorbents seem to adapt themselves to a given habitual food, and a sudden change, even from a poorer to a more nutritious diet, is evil in its first effects. If it does not impair the appetite, it arrests the fattening process, till the digestive organs can accommodate themselves to the new regimen. To make such an experiment conclusive, the two lots should have been kept separate, and fed, the one on cooked and the other on raw food, from beginning to end, and the results compared.

It should be considered, secondly, that cooking adds three times its bulk to meal ; so that with the same quantity of food, the hogs got only one-third the amount of nutriment in the cooked as in the raw state. Swine will consume a larger quantity of cooked than of uncooked food ; but the excess will still leave a deficiency equal to one-half as compared with meal in its natural state. If a hog will eat four bushels of raw meal in a month, he will eat only two bushels of cooked meal in the same time. Admitting, then, that meal is greatly enhanced in value for fattening by cooking; that the starch and oil and gluten and other nutritious substances are brought into condition to be more readily taken up by the system ; still, that the increased value of cooking meal in digestibility and ready assimilation, is equal to a gain of one-half, is, to say the least, doubtful. Science may be definite and certain in its laws, but in dealing with the vital functions, and the transformation of food into flesh and blood and bone, actual results sometimes set at naught all the fixed principles of science. No one is more indebted to science than the farmer, and in no department of his labor is its aid more available than in raising and feeding stock. But it should not be forgotten that the chemical laboratory and the stomach of a live animal are not identical in structure or solvents ; and each may evolve its peculiar products, which, with much in common, may yet have differences that will upset the most careful calculation.

The conclusion above stated is predicated on the supposition that time is an important element in the calculation : i. e., that the greatest weight of pork is to be made in the shortest time, and that this time comprises the warm months. With the ordinary imperfect conveniences for cooking large quantities, and with *finely ground meal*, the farmer can probably push forward his hogs for an early market to best advantage with uncooked food.

But where time is no object, and one has a large, convenient boiler, where the only test is the greatest weight of pork from a pound of meal, probably the advantage will be in favor of cooked food; but it will take at least one-third longer time, to say nothing of the trouble and cost of cooking.

Experiments on a large scale in the West with whole corn on the one hand, and cooked meal on the other, have demonstrated the greatly increased value of the latter. It is generally agreed that the gain is about thirty per cent.

To bring the three different modes of feeding into direct comparison, the results of three recent experiments are here given:—

1. *Field feeding on whole corn.* Says a large feeder in Hamilton County, Ohio: "As soon as the corn is ripe, I divide my stock of hogs into lots according to condition. Having fenced off about five acres of corn, I turn in the fattest lot, and let them eat till the best part is consumed; and then put them in a new piece, and let a poorer lot take their place; and so on till the stock is ready for market—the different lots going off at different times. It takes from two to three months to bring them up to from 175 to 200 pounds live weight. A bushel of corn adds eight pounds to the weight of the animal."

2. *Cooked corn meal*, by a successful farmer of Ogle County, Illinois. "I raise the Chester Whites. I can make hogs at eighteen months old average 350 pounds, live weight. From what experience I have had with ground and cooked feed, I am satisfied it is preferable to whole corn by at least four pounds of pork per bushel of corn. I do not, however, confine my hogs to cooked food entirely, as after eating a full meal of this, they eat whole corn greedily. Hogs are better to moderately salt their cooked food. I would prefer to let pigs run with the mother until she weans them herself. With good thrifty hogs, I am satisfied I can make fourteen pounds of pork from one bushel of meal. I fattened a pen of twelve hogs last spring, that gained in weight over 100 pounds each in seven weeks, the twelve weighing 3,610 pounds, live weight."

3. *Uncooked corn and oatmeal*, by a member of the South Middlesex Society. "I bought four pigs, Mackay and Chester County, in April, at six weeks old. Fed on skimmed milk, with a handful of whole corn to each pig daily, till July 1st; after which they had meal as they would bear it. The meal was a mixture of two-thirds corn and one-third oats. Fed

three times a day, and aimed to be punctual to the allotted hour. I gradually lessen the proportionate quantity of liquid as I increase the quantity of meal—as fattening hogs require but little drink. Probably I do not feed more than two-thirds the quantity of swill that most of my neighbors do to hogs of the same size and condition; and as a result, I fatten quicker and have at least that proportion less of squeal. Killed my pigs at nine months old. The dressed weight of the four was 1,104 pounds. They ate in all sixty-one bushels meal, which cost $58.37—reckoning corn at $1.08, and oats at seventy cents per bushel. One bushel of meal made eighteen pounds of pork. Cost of pork per pound, including the first cost of pigs, seven and one-half cents."

For the Committee, J. H. TEMPLE.

POULTRY.

MIDDLESEX SOUTH.

Statement of Lewis Jones.

The following statement covers a period of ten months, from November 1, 1866, to September 1, 1867.

Number of hens kept, fifteen, mostly Leghorns, a few Black Hamburgs. Number of eggs laid by the fifteen hens in ten months, 191 dozen.

EXPENSES.

18 bushels of corn, ...	$21 60
2 bushels of cracked corn, ...	2 40
	$24 00

PROFITS.

62½ dozen eggs, sold to set, ...	$28 41
126 dozen eggs, sold at market, ...	44 40
Set 2⅙ dozen eggs, raised 17 chickens, sold 5 of them,	5 00
12 chickens on hand, ...	12 00
	$89 81
	24 00
Net profit on 15 hens, ten months, ...	$65 81
Net profit per fowl, ten months, ...	4 32

Keeping.—I let my fowls run at large both summer and winter; I never coop them up not even when they have chickens. I think they do much better to run at large and pick up bugs and seeds to suit their taste.

Feeding.—I feed my fowls three times a day, winter and summer, and I think there is no animal that will pay better for being well fed, than a hen. When they are kept well fed, they are always ready and fit to be killed, either for the table or for market, and there is just as much difference in the appearance of a well fed fowl and one not fed, as there is between a well fed horse or ox and a lean one; a well fed fowl's feathers will shine and glisten in the sun, and any person can tell that it is in a healthy state. It is necessary always to have plenty of clean water for them to drink.

In the winter when the ground is covered with snow, I give my fowls cabbage leaves, or if I have turnips where the tops have started, I cut the tops off of them, and cut them up and mix them with meal, and give them about twice a week.

In the winter to help them make their eggs, I pound up oyster shells and old mortar; I also give them all the refuse bones from the table together with scraps of meat chopped up together. Since I commenced feeding my fowls in this way, there has not been a day but what some of them have laid, which is now over two years.

Statement of S. B. Bird.

The following statement of the cost of keeping and income of my fowls, is for eight months, from January 15, to September 15.

Number of eggs sold and used, 181 dozen, at an average price of 38 cents,	$68 78
16 chickens, at 50 cents,	8 00
	$66 78
Cost of keeping:	
9 bushels corn and meal, 6 bushels barley,	18 75
Net profit,	$58 03

My flock consists of fifteen hens and one crower. They are a mixture of the White Leghorn and native breed. In cold weather I feed twice a day with corn or barley, but in the summer season I find once sufficient, as my fowls are not confined, but are allowed the range of the barn and adjoining fields, thus saving several bushels of grain ; they are also kept supplied with clear water, and old plastering, or air-slacked lime, and in the winter occasionally some fresh meat and bones cut fine, which they seem to relish. I feed but very little meal, believing that whole grain is the most natural and healthy food.

Statement of C. P. Fiske.

The ten fowls which I present for exhibition are of the Brahma breed, and are out of a flock of 163. I keep but one breed, and let them run the year round. I feed on barley, corn, scraps and oyster shells, twice a day. The 1st of September, 1866, I had 113 fowls, which I valued at $213, the market price.

EXPENSES.

Cost of keeping, ...	$145 03

PROFITS.

Eggs sold, to the amount of	$232 80
Fowls sold alive and dead, ...	75 28
Increase of flock, 50 chickens, ...	100 00
	$408 08
	145 03
Net profit in twelve months, ...	$263 05

Leaving out of the account the droppings of my hens which is quite an item.

My fowls after they are one year old are fat all the time, so that I do not have the trouble and expense of shutting them up to prepare them for market. I consider the Brahma fowls the best breed of fowls that we have, taking everything into consideration.

BRISTOL CENTRAL.

From the Report of the Committee.

The show of poultry this year was, upon the whole, superior to that of last year, both in variety and quality. It is gratifying to observe, from year to year, increased evidence of a growing appreciation of pure-bred fowls. It is now comparatively rare to see coops filled with the mongrel poultry of former years. The farmers of this section have discarded very generally the long-legged, misshapen fowls, whose sole merit consisted in a certain clumsiness of size, without any compensating merit to redeem their general ugliness. They seem to have realized very generally the fact that, as a rule, disproportionate size is gained only by the sacrifice of more useful qualities. The Leghorns, Black Spanish, Dorkings, Dominiques and Hamburgs have replaced the Shanghai and other Asiatic breeds, with the exception of the best of the race, the Brahma Pootra. This variety, which is identical with the Chittagong, is well adapted to all localities where the range is limited. It is hardy, easily raised, and comes to a marketable size so early that, where raising spring chickens for the table is the chief object, it is perhaps more profitable than any other, the Dorking breed not being yet sufficiently well known to command the better price that it deserves. It is rather a sluggish breed, and on that account it may be doubted whether it will prove as profitable as some other more active races where there is ample range. It is the testimony of some of the best breeders, that after two years they begin to degenerate, the strong setting proclivity of the Asiatic races developing rapidly after that time.

The Leghorns and Black Spanish, which are varieties only of the same race, are very valuable for their laying qualities. The immense size of the combs in the males of this species may be considered, to some extent, a disability in our climate, as unless they are protected with unusual care they almost certainly freeze in winter, and this makes the birds more or less sickly and dull in the spring, when they should have a redundance of health and vigor. The Black Spanish must have a face entirely white, black plumage with a greenish lustre, and dark blue legs. The Leghorns, whatever their color, must have yellow legs, and their ear lobes must be pure white. The young of this breed are remarkably precocious.

The Dorking is a fowl comparatively little known among our farmers. It takes the lead of all other breeds in England, and should be held in much better estimation than it now enjoys with us. Prize birds not unfrequently bring, in England, from two to three guineas each, and successful breeders sell their eggs readily at fifteen dollars per dozen. The cocks have been brought up to twelve pounds in weight.

There are two principal varieties now in the country—the white and the gray, with several smaller subdivisions. In the Sir John Cathcart variety the males have hackles and saddles of red, with black breast and tail feathers, and the hens have dark buff breasts, more or less splashed with white. The Gray Dorking is a larger and finer bird than the white variety.

The following table of live weights of some of the most prized fowls, taken from the excellent work of Martin Doyle, will be found interesting :—

	Maximum, lbs.	Average, lbs.	Height, inches.	Weight of eggs, oz.
Shanghai cock, full grown, . .	12	10	26	
Shanghai hen, ...	9	7	22	2¼
Dorking cock, ...	10½	8	22	
Dorking hen, ...	8	6½	16	2¾
Black Spanish cock, ...	7	6	22	
Black Spanish hen, ...	6	5	19	3
Poland cock, ...	6	6	21	
Poland hen, ...	5	5	18	2¼
Game cock,*	6	5	20	
Game hen, ...	4½	4	15	2½
Golden Spangled Hamburg cock, .	6	5½	18	
Golden Spangled Hamburg hen, .	5½	4½	15	1¾
Malay cock,†	13	10	28	
Malay hen, ...	10	8	20	2½

From this table it will be seen that the Dorking ranks third in point of size and weight. It is an indispensable requisite that this breed should have white, with a tendency to pink legs, the slightest tinge of yellow denoting impurity. They should have five toes, the fifth pointing upwards like a spur. The cocks should have silver-gray hackles and saddles, and dark breasts and tails, though these are not indispensable, some being splashed with white ; the hens, more or less gray on the back. The color of the breast varies indefinitely, though in many of the most admired there is a tendency to a warm buff color. The white Dorking must be perfectly white. It is important, in this breed particularly, to avoid breeding in and in. A fresh cock, of another strain or locality, should be introduced every second year. The Dorking is a remarkably plump, well-made fowl, and has more white meat on the breast than any other variety, commanding, on this account, the highest price in the London market. Its flesh is of superior delicacy, retaining a remarkable tenderness and juiciness even when five or six years old. These hens are excellent layers and mothers. We hope to see the evidence of a large increase of this valuable breed at our next exhibition.

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* The writer has a game cock in his possession, three-quarters Derby and one-quarter Sefton, that weighs seven pounds and one ounce, and the hens average five pounds each.

† The Malay breed is so inferior in flesh and other respects that we cannot recommend it.

The Hamburg, which embraces among its varieties the Bolton Gray, or Creoles, is a valuable breed. They are excellent layers. Of these, the Golden Hamburgs are perhaps the most desirable for the farmer, being larger and more hardy. Some of the pencilled varieties are of great beauty. It is essential that all fowls of this breed should have blue legs.

The Game breed is a valuable one, being conspicuous for its beauty of plumage. It is remarkably hardy, and there are no better layers and mothers than may be found among this race. We have found that quite an erroneous opinion prevails in regard to their fighting propensities, many farmers objecting to keep them on this account. The thoroughbred Game, though a courageous bird, is usually *not* a quarrelsome one. Towards the young cocks that grow up under him, he is not more despotic than the average of breeds. It is true, that if a stranger dares to dispute his supremacy, he will fight to the death ; but he is not more pugnacious till his blood is aroused than many other races. The little Bantam is far more quarrelsome. He is particularly gallant towards his flock. It is exceedingly rare that he takes a prejudice against a particular hen, as is quite often the case with other breeds. The flesh of the

Game is notoriously the most delicate of all poultry. If any one has a stock of poultry which has degenerated by breeding in and in, there is nothing like a good game cock to rejuvenate the yard. There are many varieties of Game, but perhaps the most desirable for the farmer are the English, Derby, Lord Sefton, and Irish varieties, as these are of larger size than the others, with the exception, perhaps, of the Sumatra. The last is not so hardy a bird, and therefore not so reliable.

The Dominique is an excellent breed, too well known to need a particular description here. They should have yellow legs, and the cocks should have neither red nor yellow upon their wings; rose combs are preferred, though not indispensable. The Poland breeds are beautiful, but not usually profitable for the farmer.

There have been lately imported three French breeds, the Houdan, Lafleche and Crevecœur. They have a high reputation in France, and are very beautiful birds. The Houdans are speckled, and have large top-knots and muffles. Their legs should be slate-color, with five toes. We hope, another year, to see some specimens in our poultry exhibition.

We have taken the liberty to describe briefly a few of the prominent breeds, because from year to year, specimens of some of the above are exhibited as thoroughbred which have not the requisite marks of purity. For instance, coops of Dorkings have been exhibited having yellow legs. Breeders should remember that pale pink-colored legs or nearly white are more indispensable than the fifth toe. It is a singular fact that frequently a bird, not more than one-quarter Dorking, will have the fifth toe well developed, while many pure bred birds have this imperfectly formed.

IMPORTANCE OF RANGE.

Perhaps there is no greater or more common blunder made by the inexperienced, than in the estimate they make of the space required for a flock of poultry. Not less than half an acre of ground, at the very least, and of this two-thirds should be in grass, is sufficient to keep a flock of twelve in perfect health the year round. An advantage would be gained by giving even more than this. Yet how often do we see flocks of thirty and forty confined, during the whole year, to a space hardly one-half of this. To keep a flock of such a size in health, it is no test even if they thrive the first season in such limited quarters. The second or third season, at most, roup and vermin will begin to make their inroads, and after losing half his young broods, the farmer concludes that raising chickens does not pay, and it ought *not* to under such bad management.

One of the most important requisites is a good supply of grass. If fowls are shut up for any length of time in a barn-yard, fresh sods should be given them daily or they will not thrive. The question whether some other vegetable product might not answer is hardly to be entertained by the farmer, since in nearly all situations there is nothing so cheap and readily available as grass. We frequently see quite elaborate inclosures made for poultry during the spring and summer months. We are of opinion that if farmers would *fence in their kitchen gardens instead of their poultry*, they would be great gainers in the long run. The additional expense would soon be saved in the greater number of eggs procured from the poultry. In cold weather meat, in some form, is necessary, if eggs are desired. For this purpose scrap cakes from the soap-makers, in which there is no salt beef, will be found the most economical form. Indian corn is the best regular staple for food, but this should be occasionally varied by a feed of oats, wheat, barley, or a warm mash of meal and hot potatoes. The last will be found particularly useful in the winter. We are not advocates of stimulants to any extent. We do not believe that much permanent advantage is gained by forcing nature. If by high feeding of meat, cayenne pepper, &c., eggs are procured out of season, a period of rest is nevertheless necessary, and the fowls so fed will show the ill effects of this stimulating process sooner or later.

Another very important point is to be careful not to allow too many fowls to roost in one house. It was only a day or two since that a farmer was complaining of two of our hardiest breeds. "They got through the winter pretty well," he said, "but the roup or something else took a good many off in the spring." On inquiring, we found that he kept one hundred and fifty in one house. It was no wonder that the roup and other diseases took them off.

If we were intending to keep such a flock of poultry, we would have at least four different roosting places. Indeed, twenty or twenty-five are as many as should occupy the same house, unless extraordinary care is taken by whitewashing and cleansing frequently. Their roosting-places, in any event, should be whitewashed and thoroughly cleaned twice a year, and fresh earth put in every spring under their roosts. If a strong decoction of tobacco be mixed with the whitewash it will be found an excellent ingredient. Rubbing the roosts with kerosene oil is a good practice, and black sulphur scattered over the nests and roosts is also an excellent preventative for vermin or lice. These last are the greatest pest of the poultry-fancier, beside which roup and all other diseases sink into insignificance. If the hens ever get infested, two-thirds of the young chickens will almost inevitably die. Nothing so demoralizes, so to speak, a flock of poultry as this pest. Thousands of chickens die every year from this cause within the first three weeks of their hatching, which might be saved if the above precautions were sedulously taken.

Another important point in the rearing of chickens is to have them hatched early in the season. The hot days of July and August are not favorable for very young chickens. It is better to have broods hatched in September than in either of the above months in this locality.

BREEDING IN AND IN.

It is too often the practice with farmers to kill off their older poultry every two years, and continue to breed from the young. This will certainly cause the breed, whatever it is, to degenerate. If possible, when commencing with a new stock, get the hens from one locality and the cocks from another. It is better to keep the old cocks for breeding until they get superannuated than to breed from the young of the same brood indefinitely. When fowls are bred in and in they deteriorate in size, plumage and constitution.

Another important consideration in beginning with a new stock is to be sure of the purity of the breed, as there is no security if there be ever so little mongrel blood. We have known hens crossed with the Game which threw pure Leghorns in appearance certainly six months after they could have been associated with a Leghorn cock.

DUCKS.

There are three strains of ducks which are especially valuable —the White Aylesbury, Black Cayuga and Rouen. The first of these commands the highest price in the London markets. They differ from other white ducks in their greater size and the flesh-colored tint of their bills and legs.

The Black Cayugas are large ducks, so nearly black that they appear entirely so to the casual observer. The only white about them should be under the belly, though there is a tendency to a few spots on the breast.

A flock of White Aylesburys and Black Cayugas in the same pond present a beautiful contrast.

The Rouen is larger than either of the above, and in color is precisely the same as the Wild Mallard.

The wild black, or dusky duck of Audubon, is a valuable duck to cross with one of the larger species.

The varieties of geese are so well known that it is hardly necessary to mention them. The large Bremen, or Embden geese, are perhaps the finest breed known—certainly the handsomest to our eye.

We trust the above hints may be of some service to those of the society who take an interest in this subject. We have selected a few of the prominent points concerning which we believe there is need of enlightenment. There is an increasing interest rapidly developing itself in this county with regard to pure-bred poultry. Let every farmer remember that it costs no more to feed a pure-bred fowl than a mongrel, while the results in the former case are far more certain. Let him consider what breed will be most profitable for him in his circumstances.

If we were asked to condense our experience in a few words, we should say the Brahmas and Dorkings for the table, the Leghorns and Hamburgs for eggs, the Games and Dorkings where all qualities are required of a high degree of excellence; and if pure-breeds are not wanted, at least a game cock to improve the stock of any yard. The Houdan, La Fleche and Crevecœur breeds are undoubtedly capital breeds, being plump, compact birds and excellent layers, but they have not yet been sufficiently acclimated to warrant us in giving an opinion as to their profit for the farmer. There are many breeds of great beauty which are desirable only for the poultry-fancier. The raising of poultry can be made as profitable, under a judicious system, as any other branch of husbandry.

EDMUND RODMAN, *Chairman.*

BARNSTABLE.

From the Report of the Committee.

The varieties of barnyard fowl are so numerous, and so many kinds have their advocates, that it is almost impossible to gather from the various owners facts sufficient, when well authenticated, to be able to lay down any directions as to the best kind and how they should be cared for. Among those kinds of fowl which, on the whole, seem to bear best the test of close scrutiny, we will mention the Dorkings, the Bolton Grays, and the Black Spanish.

The Dorkings are a very favorite variety in England. A few of these were imported from England, where the town of Dorking is situated, in 1839. Since that time a considerable number have been brought over, so that they are quite readily to be found at the present time. Most of these fowl can be known by the fact of their having *five* claws on each foot. The color is usually white or light speckled, and the flesh fine and of excellent flavor. This breed feed well, fat well, and lay well. One of the best breeders in the country says: "In regard to the Dorkings, I am still strongly prepossessed in their favor; as layers they are certainly very prolific. As an instance, one of my neighbors had a pullet that was hatched in May. In the same year the pullet began her litter of eggs, and hatched out her chickens before the first of the December ensuing." Another breeder says: "The Dorking fowl stand first in the estimate of those who have raised them with other varieties." Another large breeder says: "Although in the depth of winter, with over a foot of snow on the ground, the hens lay daily, running out in the severest cold."

The Black Spanish is another very popular variety. These are a variety of the Poland or crested fowl. They lay large eggs and their flesh is highly esteemed. A farmer who has just hens enough for his own use, will find the Black Spanish suited for his use. The flesh is very excellent and the eggs very delicate. Their size is more favorable to him who eats them at his own table than for market. When eggs are sold by the dozen, as they usually are in the States, a large egg is no advantage.

The Bolton Grays came from Bolton, in Lancashire, England, and are the crack breed of their vicinity. The color of the genuine kind is invariably pure white about the neck, the body white, thickly spotted with bright black, with one or more black bars at the extremity of the tail. They are very constant layers, but perhaps not quite so good for the table. Among the three breeds we have named—and the three best in the opinion of your Committee—this last variety is the least inclined to set.

After procuring a flock of hens the first object is to make them lay. The question is often propounded, "Why hens cannot be made to lay in the winter as well as in the summer?" Our answer is, that they can to a very great extent. But to do this there are certain conditions that must be complied with. *They must be provided with warm and comfortable lodgings. They must have clean apartments.* They must be supplied with a plenty and a variety of food, consisting of *grain*, *vegetables* and *animal food.* They must have pure water, and gravel, lime and sand to roll and bask in. For grain feeding, corn is well enough. Oats or wheat will supply its place if they are more readily procured. The vegetable feeding should be on boiled potatoes, turnips, carrots or parsnips. The animal food, when worms are not to be procured, should be the flesh of any animals. When a sheep has died, skin him and chop him up in quarters or less, and throw him in your hen-yard, either in winter or summer. Take your axe and chop out a quarter or more of a dead cow, or ox, or horse, and put it within reach of your fowls. They will know exactly how to dispose of it. They must have calcareous matter to form the shell of their eggs. In winter, when the ground is covered with snow, they cannot find this necessary element. Then you must pound up the bones from your table and give them. They will eat it most greedily. In the summer hens find many of these requisites without your aid. Buffon says that a hen well fed and attended will produce one hundred and fifty eggs in a year and two broods of chickens.

Their greatest capacity for laying is in the second and third year. It is never profitable to keep them after they are four years old. After they are five they generally cease laying.

We have spoken of the Dorkings, the Bolton Grays and the Black Spanish as the best of the fancy breeds of hens. It may seem strange that no mention is made of the common barnyard fowl so generally found about the Cape. All we have to say of them is, that for delicacy of eating they are not to be beaten by any of the varieties named, and, if well cared for, they are a profitable fowl to keep.

Spring-hatched chickens, if kept in a warm place and well fed, will generally commence laying about Christmas, or perhaps a little earlier. To be sure, the difference of the season will affect them. If the spring is very late and cold and stormy, it will influence their early laying.

Good feeding and good breeds will avail but little without a good shelter. A good poultry house and yard are requisite to make any great profit by hens. In selecting a situation for this purpose, get it, if possible, on the south side of a building, or what is better, dig into the south side of a hill and build *into* the cavity. If you have stone enough about your farm, use it for the sides, as it is more free from vermin than wood. Choose a dry place, as there is nothing so likely to produce disease in fowl as dampness. Cold simply benumbs them and diminishes their laying, while a cold, damp hen-house or yard, produces most of the diseases they are liable to. If you build of wood, lath and plaster the structure. A spring of pure water, or if you have not that, some vessel of water placed within their reach is indispensable. The want of good water gives the hens the pip, produces costiveness and some inflammatory troubles. Dickson says: "In order to unite all the advantages desirable in a poultry yard, it is indispensable that it be neither too cold during the winter, nor too hot during the summer, and it must be rendered so attractive to the hens as to prevent them laying in any chance place away from it. The extent of the place should be proportional to the number of fowls kept, but it will be better to be too small than too large, particularly in the winter, for the mutual imparting of electricity and animal heat. There is no fear of engendering infectious diseases by too much crowding, and it is found, in fact, that when fowls are kept apart they are much less prolific."

We have no doubt that some will give instances of hens suffering, as they suppose, by too much crowding. But on examining the facts closely, and remembering that each fowl on the average requires one gill of grain a day, it will be found that light feeding has had more to do with their suffering than overcrowding. But whatever be the cause of disease, there seems to be but little general knowledge as to its cure. Everybody's flock will occasionally have sick hens, and every neighbor will have something to suggest to cure them. When disease seizes an individual, Bosworth says, it should be removed from the others as soon as discovered, and put by itself, or it may spread over the whole flock. Under proper management, nature is a prudent guardian to fowls in health, a kind nurse to them in weakness, and the most skilful physician in disease. The most common disease is the gapes or pip. The best chicken-doctors say this is produced by a small red worm in the windpipe. For this, one excellent authority says, "Tear off the scale on the tongue with your thumb and finger, and then push down the throat a lump of fresh butter that has been well filled with Scotch snuff." Another says: "These worms may be dislodged and the disease cured, by the introduction of tobacco smoke into the mouth until the chicken becomes insensible. The operation may be repeated without danger, and the second application is always sufficient to produce the death of the worm." Mr. Eli Westfall, of Rhinebeck, gives the following remedy, in substance, in the "Cultivator": "Take a hen's feather and strip it, except about an inch at the end. Strip back the end after wetting. When the chicken breathes, the windpipe will be open. Enter the point and push it well down, with the neck in a straight line. Turn the feather as you draw it out, which will loosen the worms, and the chicken will sneeze them up." Major Chandler, in the "Tennessee Agriculturist," says: "Keep iron standing in vinegar, and put a little of the liquid in the food every few days."

For the *snuffles*, in addition to the remedy for the pip, melt a little assafœtida in fresh butter, and rub the chicken about the nostrils after cleaning them out.

For the *roup* or *catarrh*, keep them near a warm fire, wash the nostrils with castile soap-suds as often as necessary, and the swollen eyes with warm milk and water.

For *lice*, ashes or lime or sand, or altogether, to roll in. But an ounce of prevention is worth a pound of cure. Keep them dry and warm, especially at the moulting season. Clean out their roosts often, and whitewash inside. You will then have a healthy flock, that will fully repay you for your trouble.

Loring Crocker, *Chairman.*

DAIRY PRODUCTS.

ESSEX.

From the Report of the Committee.

It is a fact well known that the production of butter and cheese is not a leading agricultural interest of this county. Our numerous cities and villages require a large proportion of the dairy product in the form of milk, and this proportion is constantly increasing. And yet it does not necessarily follow that less effort should be made to produce the best qualities of butter and cheese. Most of the farmers, and many who are not farmers, produce their own butter ; and as no poor article of food—always excepting poor bread—so injures an otherwise good meal as does poor butter; and as our enjoyment in life depends largely on the quality of the food we eat, it perhaps follows that excellence in the manufacture of butter will contribute quite as much to our comfort and happiness as if it were the leading agricultural product.

We were struck with the similarity of the statements of the contributors of butter—both of those who received a premium and those who did not. The manner of making seems to be in most cases essentially the same. And yet there was a wide difference in the quality of the different samples—a difference which could not be accounted for by any difference in the methods of making. We suppose the highest excellence in the production of butter requires three things: 1st, cows that give the best quality of milk; 2d, feed of the best kind; 3d, the best method of making the butter. The first named requisite is no doubt the most essential. We want for butter purposes a good stock of cows, whose chief excellence consists in giving milk rich in butyraceous particles. This is the first step towards improvement, and here arises a practical difficulty. How shall we get such a stock? If we could have cows which would *average* as the best we now have, either for the production of milk or butter, the dairy would be the most profitable branch of farming. Is this result attainable? If so, how? We believe it is, but not by going to Brighton, or the country, and buying the cheapest looking animal to be seen; neither is it generally a profitable operation to pay extra prices, because cows are highly recommended. Most farmers do not sell their best cows until they grow old, or something befalls them to impair their usefulness. No doubt the best cow is the cheapest, even if a high price is paid, but the difficulty is to be reasonably certain that the cow is as good as the price. We believe the best way and the only way in which we can make any real improvement in our stock is to raise it ourselves. It is true that many of our Essex County farmers think that stock-raising does not pay. Undoubtedly it does not pay to raise inferior or even average stock here, and sell it as soon as it arrives at maturity. But experience and observation both convince the writer that it pays to raise good cows. By putting our best cows to a bull from good butter or milk stock, and raising the heifers, we shall be pretty certain to get a better stock than we can readily buy, and by a systematic and judicious management vastly improve the quality of our cows. If it is said that cattle can be raised somewhere else cheaper than here, we admit it. But the cattle are not raised with reference to milk or butter. Breeders generally are not careful to breed only from the best; and if we want the best we must breed them ourselves. Even if it does not pay at once, we shall be making permanent improvement, which in the long run will be sure to tell. It will create an interest, and by raising the standard will lead stock-raisers to be more careful in the selection of their animals. This matter lies at the foundation of all improvement, either in the production of butter or milk. It costs but little more to keep a cow that makes three hundred pounds of butter per year than one that makes but two hundred, or that averages ten quarts of milk per day than one that gives but six. How to obtain such cows is the practical problem to be solved. Much might be said relative to the other points mentioned. We imagine that if our farmers had a better paying class of cattle they would naturally feed better ; and when we furnish our wives and daughters with the best material for the manufacture of butter and cheese, we do not believe *they* will be found lacking in their part of the business.

For the Committee,

JOSEPH S. HOWE.

Statement of Hannah Lambert.

This parcel of butter, consisting of fifteen pounds, was obtained by the following process : First, the milk was strained in nicely scalded tin pans to the depth of two and one-half or three inches, then set in a cool room, where the air was kept as free as possible from all impurities, to stand about thirty-six hours ; after which the cream was removed to an earthen jar, and stirred twice every twenty-four hours, until the time of churning, which was eight days after the first cream was collected. It was churned in "Davis's Patent Self-adjusting Churn." When the butter was well collected, the buttermilk was drawn from the churn, and the butter removed by hand, care being taken to press all the buttermilk possible from it. The butter was then weighed and one and one-quarter ounces of salt added to each pound of butter. The whole lump was then put in a cool place to remain twenty-four hours ; when each pound was taken separately and all the remaining buttermilk removed by hand. The lumps were then left for twelve hours to partially harden, when they were put into their present form, by the use of common butter-clappers.

Statement of Mrs. Nathaniel Carleton.

I present for your inspection fifteen pounds of butter made from the milk of six cows in two days and a half. The milk after being drawn is strained in tin pans, set in a cool, well ventilated room, and after standing thirty-six hours the cream is then taken off and kept in a cool place till churned ; the butter is then taken from the churn and salted to the taste. In from twelve to twenty-four hours it is again worked over with the hands till it is perfectly free from any moisture. Then with clappers it is made into the shape that is presented to you.

Statement of Mrs. Farnham Stiles.

I present for your inspection, a box of September butter, containing sixteen and one-half pounds. Process of making: The milk is strained into well scalded tin pans, and placed in a well ventilated dairy room, to remain from twenty-four to thirty-six hours; the cream is then removed into a stone jar and stirred twice a day. We churn once a week. The butter is taken from the churn into pure cold water, and the buttermilk thoroughly worked out with the hands and salted to the taste. After remaining about twenty-four hours, it is worked again, and made into lumps as presented.

MIDDLESEX.

Statement of Mrs. John S. Hartwell.

The milk room is on the north side of the house, with a window on two sides, giving a free circulation of air—the windows being screened to keep out the sun in hot weather.

The utensils used are of wood, with the exception of pans and cream pails, which are of tin. The milk is strained into pans and allowed to stand in cold weather thirty-six hours, and in warm weather twenty-four hours. The cream on being taken from the milk, is carried into the cellar, stirred every day, and remains there until the day before churning, when it is hung in a well, the temperature of which is about fifty-five degrees. We churn three times a week. No water is used at any time about the butter. The butter is salted with one ounce of salt to the pound, which is added after the buttermilk is thoroughly worked out. The butter is worked with the hands. The feed of the cows is, in spring, hay with two quarts of corn meal each, per day; in early summer, pasture grass and one quart of meal; later in the season, green corn fodder is fed twice a day.

Statement of Mrs. H. L. C. Green.

This butter was made from the milk of three native cows. The milk is milked into tin pails, carried to the milk-room in the cellar, and strained into tin pans, filling each pan about two-thirds full. We aim to keep the temperature of the room at about sixty degrees. The milk is allowed to stand thirty-six hours, when the cream is put into a stone jar, where it is thoroughly stirred twice a day, and allowed to accumulate one week. It is then strained through a linen strainer into a common crank churn, and churned usually about forty minutes, keeping the temperature of the cream, during the time, at about sixty degrees. The buttermilk is drawn off, and the butter taken out by hand into a wooden tray, and worked over by hand. The butter is then salted at the rate of one ounce of sifted salt to the pound, and thoroughly worked in by the hands. It is then allowed to stand six hours, when it is worked over again; and after another six hours it is again thoroughly worked over by hand. It is then put through a mould into the box. No water is used about the butter.

The cows were fed entirely on common pasture feed, and without roots or grain of any kind.

WORCESTER WEST.

From the Report of the Committee.

What is required to produce the best quality of butter? My answer is:—

First. Good cows. As to what breed is best, I shall not attempt to discuss.

Second. Good feed. English grass, cornstalks, Indian meal, pumpkins and carrots are among the best kinds.

Third. Pure spring water for drink.

Fourth. A dry, cool, well-ventilated room to set the milk in for the cream to rise.

Fifth. The utmost cleanliness about the dairy-room and utensils.

Sixth. Temperature and length of time for cream to rise is to be considered.

Seventh. Churning and removing buttermilk.

Eighth. Salting.

Every dairyman should know the exact quality of the milk of each one of his cows, for there are cows from whose milk good butter cannot be made under any circumstances ; all such he should rid himself of at once, as their cream would spoil the butter of a whole dairy. The *butter* from such cows is soft and oily, has a strong smell and taste and a white color.

Food.—Among the grasses of our pastures, white clover is deemed the best adapted to the secretion of rich, good-flavored milk ; hence the importance of securing its growth in our pastures. This can be done easiest and cheapest (where pastures are so rough and rocky that the plough cannot be used,) by the application of ashes or plaster, according to the nature of the soil. Pure running water is indispensable to the production of good milk.

Raising of Cream.—In regard to this point three things are essential : First, good light. House cellars are unfit for the keeping of milk ; there is not sufficient light. Second, a free circulation of air. Third, proper temperature. The temperature should not be over eighty degrees Fahrenheit, and not less than sixty degrees. At this temperature the cream will all rise in twenty-four hours or less. The pans should be set upon slats, to allow the air to circulate under them. The depth of milk in the pans should not be over one and one-half inches. Cream that is produced at a less temperature than has been spoken of contains caseine, which will cause offensive products by fermentation.

There should be the utmost cleanliness about the dairy-room. It should be whitewashed annually, and the wood-work painted with oil paint. One practical dairyman says : "Cleanliness may indeed be regarded as the chief requisite in the manufacture of good butter. Both milk and cream are so exceedingly sensitive to the air, in everything with which they come in contact, as to impart the unmistakable evidence of any negligence in the taste and flavor of the butter."

Utensils.—All utensils should be made of tin, to prevent milk turning acid. Wooden vessels should not be used, as they cause acidity.

Churning.—The object in churning is to break the little sacks containing the particles of butter. This is done by continued agitation, and is best facilitated by previously allowing the cream to become slightly sour. This sourness takes place in the caseine that is with the cream, and does not injure the butter.

The quality of the butter is largely influenced by the temperature of the cream. It is generally admitted that cream must be at sixty-two degrees before separation can take place; also that it is better to raise it from fifty to fifty-five degrees by churning than to have it at a higher temperature when put into the churn.

The only secret in making butter that will keep a long time lies in thoroughly separating the buttermilk from it. Buttermilk contains caseine, which is liable to decomposition; hence the necessity of the separation of the buttermilk.

Salting.—It is an erroneous idea that salt will preserve butter. Salting is a mere matter of taste.

Work out *all* the buttermilk, salt the butter to suit the tastes of those who eat it, and all will be well.

For the Committee,

J. P. REED.

WORCESTER WEST.

From the Report of the Committee.

CHEESE.—The reputation of Worcester County cheese has long been a source of honorable pride to the agriculturists of this region. The price it has commanded in the markets of the State and nation has rendered it the best business for profit a farmer could pursue. The topography, the soil and the climate of these, our hills and valleys, have had much to do with this result. That far-seeing enterprise and public spirit which, years ago, introduced at a personal sacrifice, the imported breeds of cattle which have so much increased the quantity and improved the quality of the milk for dairy purposes, is an element of present prosperity that is worthy of a kindly and grateful remembrance. The Durham stock, which fills so many of the requisitions of profitable dairy and farming purposes, has been a source of incalculable benefit to this community, and as the grade Durham cows and oxen, heifers and steers, mingle with the more beautiful and docile Devons, the nervous Jerseys, the rich milk-producing Ayrshires, and the stately

Dutch cows, each rivalling the other in some particulars, the memory of him who first introduced it here will be associated with them, and warmest wishes that health and prosperity may attend his declining years in his home, near the old battle-field of Bull Run, in Virginia, will find a place in every manly farmer's heart. And while we deem it not unfitting to pay this tribute to him who first brought within reach the improvement of our native stock of neat cattle by Durham crossings, it will not be inferred that the claims of later improvements are denied or overlooked. In view of the adaptedness of our soil for grazing and dairy purposes, it would seem to be worthy of consideration whether it would not be advisable to breed cattle here, especially for their milking qualities, and rely on the cheaper pastures of Vermont to furnish our working oxen, and the rich bottom lands of the Connecticut Valley and the West to supply our tables with beef. The experiments which have been recorded would seem to establish that the Ayrshire stands at the head of breeds for yielding rich milk, and we may look forward to continued improvement in the future as has been seen in the past, as this splendid stock becomes no longer an exotic, but an acclimated element of our famous herds. That careful scientific breeding will improve the quality, increase the quantity, and so enhance the profits of cheese-making, must be apparent.

But a good cheese is not due alone to the soil, the pasture, or the cow. Its production requires a resolute will, a strong arm, a steady nerve, an active mind, a retentive memory, a correct and self-reliant judgment, a pure, cultivated taste, and habits of steady, faithful industry. The various considerations of weather, of strength of salt, of virtue of rennet, of time of probable market, each requires adjustment: while the little globules in the milk, which contain the butter that gives the richness of taste to the cheese, are easy to escape in the whey under the treatment of a careless or inexpert dairywoman. And here your Committee would take occasion to protest against the doctrine promulgated in an essay published in the last volume of the "Agriculture of Massachusetts," that the successful manufacture of dairy cheese is a thing of chance. It is, on the contrary, a matter of such exact science that dairies in our midst have preserved their uniform peculiarities of looks and flavor and taste for successive generations, and some of them are as well known in the market as the marks that designate an Ayrshire or a Devon, or the brands of flour or tobacco. Whoever, in the varied pursuits of life, accomplishes the work before him in the manner that uniformly produces satisfactory results, deserves to be hailed as a skilful workman, and such, we emphatically assert, is the award due to the contributors of cheese for the society's premiums.

The progress of improvement in husbandry, in agricultural implements and methods, has not passed the dairy room untouched, but the cheese factory has come in its wake to relieve the farmer's wife of a constant source of anxiety and responsibility, of toil and perplexity. Many a generous mind, in view of the years of toil his mother has endured in care of her cheese, has left for other and less certainly remunerative occupations, the home of his boyhood and the business in which his father had lived and died rather than subject his chosen partner to the life-work which in so many cases brings old age ere yet the prime of life is past.

These will hail with warm welcome a relief so much to be desired. Lightening the toil, and rendering it possible for the farmer's wife to share the dignity as well as the responsibility of his vocation, it would seem to add new inducements to the many that favor its selection as a pursuit for life. And we can but express the hope that more and more of the sons of New England may as they come upon the active stage, be induced to tarry at the old homesteads where their fathers and mothers have with more difficulties to surmount, achieved an honorable distinction as the intelligent, enterprising and prosperous yeomanry of the centre of the Commonwealth.

We would by no means be understood that the cheese factory has yet reached its highest development, or that there are no drawbacks to its substitution for the dairy-room. In spite of a temporary popularity common to new things which has caused the factory cheese to command a higher price than the dairy, we are constrained to believe and put on record our conviction that in the richness and flavor, in adaptedness to the purest taste, the dairy cheese of Worcester West still maintains its long honored position of pre-eminent excellence, and the specimens we have examined are worthy to be cited as example.

We are not sufficiently skilled in the process of manufacture to determine whether the mode of cooking the cheese before subjecting it to the press sends more of the butter into the whey than the slower process of the dairy, but the taste of the different kinds of manufacture, as well as the superior results of feeding it to pork at the factory over that at the farm would suggest the inquiry whether the pigs do not gain what the cheeses lose. It is claimed, indeed, that cooking the whey increases its nutritious qualities, and it is no doubt true, as this seems to be a general law for man and beast. The cost of carrying milk to the factory is no inconsiderable element, and the value of the swine on a farm to keep up the replenishing of the soil, will not be overlooked by those farmers who regard their lands with kindly care, whose producing power is to be nourished and kept good rather than to be exhausted and abandoned. These various considerations will not induce an abandonment of this new system of cheese-making and return to the old one that exhausts and wears out the wife and mother while it fills the purse and improves the lands, but will rather serve as a stimulus to inquiry as to the best methods of obviating the objections and still continue to improve and elevate the business of dairy farming.

In behalf of the Committee,

EDWIN WOODS.

HINGHAM.

From the Report of the Committee.

In so important a matter as butter,—no longer a mere luxury, but a recognized agent to health,—it is indeed surprising that so little interest is felt. A constituent of health it *ought* to be regarded, and poor butter as well as poor meat be thrown to the dogs.

One of the greatest difficulties in coming to a right judgment in this matter of butter is the excessive use of salt; it fairly amounts to an abuse; in some instances, none but a tongue which had been in pickle a week could bear it. If, in the Dutch penal settlements, total eclipse of salt is the most grievous punishment devised by human ingenuity, excess of it is equally bad; and your chairman would respectfully suggest—feeling confident of the approbation of the rest of the Committee

—that a rule should be imposed upon future contributors. Your chairman does not wish to go to a Dutch penal settlement, but must decline to serve again if there is no limit to the saline furore or mania of these exhibitors; and, moreover, he would humbly suggest that the rule should be rather in inverse than direct ratio to the bulk. In Europe, where no humbug or sham is allowed in articles of food, and a good many other things too, salt is added at table. We might not like this; still it has the merit of making every one his own seasoner. I know one will say, "If you like less salt, stipulate for it and you will get it." I reply, "So high is the saline standard to the pound, that I have for nine years labored in vain to get it lowered in my favor. Spasmodic effort produced only temporary relief: the disease is chronic."

It may again be well to know how far coloring matter is legitimate. We personally regard it as "a delusion and a snare," and as much out of place as on the cheek of a fair maid in her June heyday of life. In *old* butter it may be a debatable point, and *on* old women from parity of reasoning. Let us have none of the "adulteries of art" in butter, at least.

We so far disagree with one of our predecessors in his report, when he ascribes the want of good butter to the adherence to old methods; for, to our way of thinking, the butter of to-day is not so good as the butter of the elder day. Good butter cannot be made without a good conscience. The golden age of butter is gone, and will not return in this age of disloyalty to common sense; for the conscientious labor it requires is at a discount, and is held disreputable where once it was honorable. We all know that the hands which once would "have driven the team afield" prefer too often to gamble in stocks or trade; and those which held the churn, to quiddle over equivocal finery, or dilute their sympathies with fictitious woes. Let the epitaph of such be, *not* those blessed ones to her of old, "She did what she could," *but* "They did what they wanted to."

We may be thought to have written a diatribe, but not so; for we have no spite to gratify. But, as we hold consistency in men (and butter too,) to be the acme of virtue, we ask the simple question, man-fashion, Does any agricultural society fulfil its mission by annual shows of surpassing excellence, *unless* these noble beeves and herds and firstlings of the flock, fruits, vegetables and produce are a sample and earnest of what any one, for a fair price, can purchase in open market for his daily needs? CHAS. F. SHIMMIN, *Chairman.*

BERKSHIRE.

From the Report of the Committee.

The importance of the dairy interest to the farmers of Berkshire, and the demand in market for a different quality of cheese, seem to call for an extended report in this department.

In noticing the report of the Boston market for the last week in September, the range of prices is from five to fourteen cents per pound. Taking into account the price of labor, cost of living, taxes, &c., making cheese at fourteen cents per pound is not considered a very profitable business for the dairyman. If this is so, making cheese for five cents must be an up hill business.

Why this difference in the price of cheese? Various causes may arise to produce this result, but the main cause is in the mode of manufacture. Without assuming to know all about making cheese, we propose to offer a few suggestions which we hope will awaken more interest, and perhaps call out discussion on this important branch of agriculture.

It is an old saying that "tastes differ," and this is particularly so in regard to cheese; but if consumers were aware what produced certain tastes and odors in cheese, they would take as sudden a dislike to them as a gentleman did to a certain kind of sausages when they were mentioned in connection with dogs.

At present, different markets may require different qualities of cheese, but probably the time is not far distant when a more uniform style and quality will be required in all our principal markets.

Within the last few years the foreign demand has largely increased, and is likely to increase still more, and it is equally certain that our home market will greatly improve when all branches of industry are favored with continued prosperity. A large proportion of the cheese made in Berkshire during the last thirty years has been sent to market green, but owing to the demand for cheese to export, the market has undergone a change, and when consumers shall become more acquainted with the relative value of green and ripe cheese, such as is required for export, our home market will undergo a like change.

A cheese manufactured expressly for the purpose of being sent to market green, and which may sell for a good price in a green state, may become a very bad cheese when it is thoroughly cured. For this reason some dairymen, whose cheese has commanded a good price in market green, have been disappointed in not getting higher premiums at our annual fairs.

Within the last few years the factory system has been introduced, and has come into such favor that cheese factories have sprung up like magic in most of the dairy districts of New York, Ohio, and some other States, besides several hundred in Canada. A few factories are in successful operation in Berkshire, and there seems to be information wanted in regard to them, in some dairy districts, which we propose to give.

In a neighborhood where there are from one to ten hundred cows or more kept for dairy purposes, they may advantageously adopt the factory system. Four or five hundred would be better than a less number, if they could be obtained. Possibly an individual might be so situated as to make it more profitable to make his own cheese, but there is no doubt but dairy districts would find it for their mutual advantage to adopt the factory system. The requirements are: First—a neighborhood should be agreed to adopt the factory system. A situation should be selected which will accommodate all, as near as may be. Some way must be provided for cooling the night's milk during warm weather, and the best mode is where a cool spring can be obtained at no great distance, with a fall some ten feet or more, so that water can be conveyed around the vats. Some factories obtain water from wells, but this requires additional labor and expense. In some localities warm water could be filtered through ice, but where springs can be obtained they are much the best. Milk may be carried without souring four or five miles or more, but two or three miles is about as far as most people would think best to carry it. Most of the milk should be carried night and morning in warm weather, but if the night's milk is thoroughly cooled and carried in a separate can, it may be carried perfectly sweet several miles. Much expense may be saved if an arrangement can be made for one to carry several dairies where they live on the same road. Where self-heating vats are used, a building one hundred by thirty feet, two stories high, is sufficient for five hundred cows. A good frame, double boarded, matched or battened, is sufficient for all purposes. The expense of such a building, with all the fixings required, would be about twenty-five hundred dollars. Probably the best vats made for either factory or private dairies, are the Oneida, manufactured by Wm. Ralph & Co., Utica, N. Y.

An experienced cheese-maker is necessary for the successful management of a factory, and no one should ever undertake to manage a factory who has not served a faithful apprenticeship. Rules may guide, but experience and good judgment are necessary to manufacture a uniform and good dairy of cheese, be it a factory or private dairy. In the first place, everything in and around the establishment should be scrupulously clean. Tubs should be entirely discarded, and tin vats used.

Milk is composed principally of cream, caseine and water, or whey, and to make a good cheese the cream and caseine should be united and entirely separated from the whey, consequently whole milk should be used; and a good rich cheese cannot be made where any considerable portion of the cream has been removed from the milk.

In making cheese, the night's milk should be strained into the vat and cooled to about sixty-eight degrees. What cream arises during the night should be skimmed off and placed in the strainer, and the morning's milk strained through it, which will warm it sufficiently to incorporate it with the milk, and the whole warmed to eighty-two degrees. It is very important to use good sweet rennet, which is prepared as follows: The calf should be at least four days old, and killed ten or twelve hours after sucking the cow; the curd and everything unclean carefully removed, the rennet well salted and dried in a warm place. A clean jar or cask should be used for preparing the liquid for use, and for every hundred cows prepare from four to six rennets; add one gallon of water, which has been boiled, to every two rennets, and more rock salt than the water will dissolve; let it stand, rubbing the rennet occasionally with the hands, and stirring every day for several days, when it will be fit for use. It should be of sufficient strength for one common teacupful to curdle sixty gallons of milk. Some use whey instead of water for preparing rennet. The rennet must be well stirred into the milk, and the surface of the milk gently stirred until it just begins to curdle (to prevent any cream from rising,) which should be in about fifteen minutes. In about one hour the milk should be thoroughly coagulated and ready to be cut, coarsely at first, then left to settle and then be cut very fine. If this is nicely done and at the right time, the whey will be and remain of a deep green color, showing that no cream has passed into the whey. The temperature should then be raised gradually to one hundred and four degrees, stirring it gently while it is being heated, and after to keep it from packing. A gang knife or some sharp instrument ought to be used for cutting, and the cheese never should be broken or squeezed with the hands, as this will diminish the quantity and injure the quality. An old lady used to often remark that, "a long scald was just as good as a short boil." This might not be true in boiling dinner, but it is certainly better in making cheese.

If the cheese is to be exported or kept through warm weather, the curd should remain until the whey becomes slightly acid, which will make a firm cheese, and prevent fermentation from taking place afterwards.

After the curd has been sufficiently cooked, it should be cooled to about ninety-four degrees, then drained, and salted with three pounds of salt to one hundred pounds of cheese. Some use three pounds of salt to one thousand pounds of milk; but, as eight pounds of milk in October will make as much cheese as ten and a half in April, or nine and a half in June, judgment is necessary in salting. Cheese sent to market green requires less salt. After the cheese has been pressed two or three hours, it should be turned, and bandaged with light, firm, bleached cloth, then remain in the press until the next day. The place for curing should be dry and airy, of an even temperature, and not too warm. The size of cheese should be suited to the market to which they are sent, the depth about half the diameter; but, whatever size or shape is adopted, they should be uniform.

Whey-oil is best for rubbing cheese, and but just enough used to prevent them from cracking. Some markets require coloring on the inside; and a preparation of anatto is used for this purpose, put into the milk just before the rennet. This should be nicely prepared and well stirred into the milk, and not too much used. Coloring on the outside seems to be unnecessary, but some practise it. This is best done by using annato with the oil.

When the cheeses are ready for market, they should have a clean, neat appearance, and not be daubed over with nasty, filthy grease, as some appear to be. Use good strong boxes, with covers nicely fitted to the box.

The foregoing remarks apply more particularly to making factory cheese. Smaller quantities of milk may require more heating, especially in cool weather; and less salt is required for small cheese. The best salt for butter or cheese is Ashton's factory-filled.

When a cheese is rightly made, it will retain its original shape, be solid and firm on the outside, yet soft and rich on the inside, with a mild, pleasant taste.

Some of the advantages of factories are these: Few if any farmers are inclined, or could find time, to make their own cheese, and it is difficult to hire help to do it; and farmers' wives generally have more work than they ought to do, without making cheese, and ought to be relieved from this heavy burden. The superintendent of a factory devotes his time to this one thing, and makes this a business and study. Factory cheese commands a higher price in market than the best dairies, and very much more than the average price of dairy cheese.

There are undoubtedly many places where cheese can be made with less expense; but, with our sweet pastures, pure water and many other advantages, Berkshire ought to be as much celebrated for making superior cheese as Cheshire in England has been, or as Orange County in the State of New York now is, for making superior butter.

Dairymen should profit by the example of other manufacturing classes, hold meetings, form conventions, for the purpose of comparing notes and discussing matters pertaining to their interests, and success will crown their efforts.

For the Committee,

S. W. LINCOLN.

BARNSTABLE.

From the Report of the Committee.

The products of the present year were equal in quality and quantity to that exhibited in past years. Perhaps we may say that in quality it was in advance of preceding years. But there is much yet for the farmer to do to get the most butter from any given number of pounds of hay. The great desideratum is to turn the least amount of grass into the greatest amount of gold. This can only be done by great care and exact knowledge. The best way, too, is not always the most costly. Perhaps, on the first start, a small outlay may be required, but in the end it will pay many fold. The making of good butter and of a large amount from a single cow, or from a herd, is not the easiest thing imaginable. The feeding of the cows, the milking of them, the *carrying* of the milk, even, the setting of the milk, the time and manner of skimming, the temperature of the dairy, the churning, the washing of the butter, and the packing for winter can all be done well by the careful, tidy dairy-woman, or ill by the slatternly sloven. In fact there is not a single detail of the whole process of turning milk into butter and cheese that cannot be so done as to be profitable to the husbandman, or so done as to waste his labor and capital.

Feeding the Cows.

With poor feed,—with salt hay or black grass alone,—the best cow will produce miserable milk, and worse butter. She should be fed on food that will make her thrive. You could feed a cow, and perhaps keep life in her, so that she would not average a pint of milk a day, and so lose your feed and your labor, just as you might feed a hog so that he would not grow a pound in the whole year, and thus lose all the corn you had given him. To be sure, we cannot lay down an exact rule of feeding, because some farms produce different crops from others; but we will take the liberty to suggest how one of the greatest dairymen of the United States feeds his herd, who grows regularly rich in the operation. His plan was to give each cow two quarts a day of *mixed* provender, consisting of one-third each of corn, oats and buckwheat, ground together, with hay up to

May 10th ; from May to early in September, grass alone ; from September to midwinter, corn, sowed broadcast for forage, and carefully cured in the sap or when green. When that was expended, carrots and pumpkins to the time of their exhaustion ; and then, say the first of February, he commenced on this mixed provender, and continued it, with hay, to the 10th of May.

Milking the Cows.

No one but a careful observer is aware how much there is in the mere milking of a cow to make a good yield of milk. One of the greatest requisites is *gentleness.* A harsh, rough handling by a coarse man or a coarser boy will pinch a cow's milk almost one-half. The cows, then, should have a gentle milker. If you have a hired man who kicks or cuffs them, or *swears* at them, discharge him at once. Then she should always, if possible, have the *same* milker. She should be milked as quick as gentle usage will permit, and, in rough weather, always *in* the stable, with some food before her. And, lastly, she should be milked at *regular* hours. Going home to milk one night at five o'clock and another at seven, and so on, will do very much to diminish the milk of any cow.

Carrying in the Milk.

It is better, if convenient, to have some one to carry in the milk when you have a herd sufficient to furnish a number of pailfuls. To stop in the middle of milking for any purpose will cause the milk to cease flowing. Then it should be strained into a large can ; and, when you have strained in the whole mess, it should be *well stirred* with a ladle till the foam disappears. The foam impedes the rising of the cream, and the stirring is necessary, as the milk of some of your cows will require more time to separate than others ; but, if stirred, you will not have to watch each separate pan. When the cream is ready on one, it will be ready on all.

Setting the Milk.

The best-sized pan is one holding about seven quarts, with flaring sides and large diameter. In hot weather, put about two and a half quarts in a pan ; in cold weather, three quarts.

In cool weather, the milk may stand longer, so that it may be a little deeper in the vessel. We hope none of our farmers will deride this proposed accuracy. We say to you that SHALLOW SETTING produces the most cream. If you don't believe it, try it and you will be convinced.

Time to Skim.

When the milk has become somewhat thick at the bottom, it is time to skim it. Some let it stand too long; and, although this does not diminish the cream, yet, if you wait till the milk has begun to turn to water, it will produce a bitter taste in the butter, which no washing will destroy.

Temperature of the Dairy.

It is well to have a thermometer in every room where milk is set for cream. As near to sixty-five degrees of our common thermometer as the room can be kept the better. To be sure, in winter it will be somewhat below, and in summer something above; but a well-located room, and well protected, may be kept so that it will not vary more than eight degrees. In winter, when this temperature cannot be got, it is a great help to the rising to set the milk-pan *inside* of a larger one, and pour into the outside pan some scalding water, and so increase the warmth.

Churning.

In churning, it is desirable to have the temperature of the milk and churning-room at about sixty degrees at starting. In hot weather this can be produced by ice. By agitating the milk in a warm atmosphere it will become a degree or two warmer and about right.

The Butter.

Here comes the nice part for the dairy woman to perform. She can do this in clean pans, with "clean hands and a pure heart," with a snow-white apron and her hair brushed neatly and every filament secured so that not one will fall into the sweet and agreeable mass which she is about to manipulate; or she can come to her work with dirty finger-nails, and a mop-head, and a filthy dress, and greasy utensils. To the one latterly arrayed we have nothing to say; but to the former our advice is, to wash her butter in clean cool water three times, or until the water brings away no buttermilk. Then sift some fine salt (Ashton is the best,) and salt it by using one ounce of salt to a pound of butter. In the summer time a little more salt may be added, as some will be dissolved by the last buttermilk. After salting put the butter in pans on a cool floor, and after four or six hours, work out the last buttermilk. Then let it stand till next day, and make it up into balls for sale, or pack it for future use.

We have thus far said nothing about the kind of cows which is best for the farmers of Barnstable County. This would come more appropriately in a report upon "Milch Cows," but we cannot close without saying a word upon this subject. As far as the production of cream is concerned, and a kind of cream that will produce the sweetest and yellowest butter upon fair feeding, there is no cow so good as the Alderney. When *quantity* of milk only is required for daily sale, we perhaps should prefer the Ayrshire, because our pastures are not rich enough for the Durham. But as our subject is only the dairy, we should leave the question of quantity of milk to other committees and confine ourselves to butter alone. Well, then, the cow that makes the best butter is the Alderney; and any gentleman who wants but one cow for family use, and can afford it, had better procure one. It would be well for any farmer who has a herd of native or grade cows, to have one Alderney to color and flavor his butter. The sweetness of butter depends very much on the sweetness of the grass and hay. Some farms produce very sweet feed, and such will make good butter from any good cows, whether blood cows or natives. Where the grass of a farm is poor and sour, as it is on many farms, not even Alderneys would produce very sweet butter, and so the cow might suffer in character when the cause was the food.

DANIEL SCUDDER, *Chairman.*

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